EFFECTS OF FEAR-AROUSING COMMUNICATIONS ON DRIVING SAFETY ATTITUDES AND DRIVING BEHAVIOR

By

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To

My wife, Sue,

Who stuck with me.

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INTRODUCTION

The term attitude is a central concept in social psychology. Perhaps it is not incorrect to say that, as a more acceptable concept, it has taken the place of instinct as a basic mediator and predictor of behavior. In this role it has come to serve one of the fundamental needs of man, both layman and scientist. This is his need to attribute both consistency and predictability to the behavior of others. Many definitions and conceptualizations of attitude have been offered and are found in the literature. While these vary considerably in both form and content, they all explicitly or implicitly assume for attitude the characteristic of consistency.

The following examples of definitions of attitude vary along a continuum of generality--specificity. Katz and Stotland (1959) state that attitude was first introduced into the behavioristic system as a neuromuscular set, or predisposition, to respond to a certain stimulus or type of stimulus. Newcomb (1950) interpreted the concept as a state of readiness or predisposition to act. Sherif and Cantril offer an attempt at greater differentiation of the concept: "An attitude is an established readiness which has a subject--object relationship of highly variable content, which is learned (formed), has affective properties with various degrees of motivational components, may refer to whatever stimuli are encompassed in the subject--object relationship, and which determines that an individual will react to a stimulus in a selective way" (1946, p. 19). Campbell has presented the following operational definition of attitude: "An individual's social attitude is an enduring syndrome of response consistency with regard to a set of social objects" (1950, p. 31). A somewhat more comprehensive definition was offered by Krech and Crutchfield as: "... an enduring organization of motivational, emotional, perceptual, and cognitive processes with respect to some aspect of the individual's world" (1948, p. 152). In their revised edition, the definition has been modified to read: "An enduring system of positive or negative evaluations, emotional feelings, and pro or con action tendencies with respect to social objects" (Krech, Crutchfield, and Ballachey, 1962, p. 177). This is similar to the definition offered by Katz and Stotland: "An individual's tendency for predisposition to evaluate an object, or the symbol of that object, in a certain way" (1959, p. 423). The concept appears slightly modified, and--to my way of thinking--with more clarity, in an earlier article by Sarnoff and Katz: "An attitude is a stable or fairly stable organization of cognitive and affective processes around some object or referent" (1954, p. 116). This is quite similar to Shaw and Wright's definition: "An enduring system of positive or negative evaluations about a social object, or class of objects" (Shaw and Wright, 1965, p. 5). These latter definitions incorporate the implication that the evaluative aspect of the attitude mediates the behavioral component, i.e., its action tendency.

The present study was modeled after those of Hovland and the group at Yale:

> Looked at from the standpoint of general behavior theory, attitudes are viewed as internalized anticipatory approach or avoidance tendencies toward objects, persons or symbols. They are habits, and the general principles of

> learning should be of aid in understanding their acquisitions and modifications. (Hovland, 1951, p.427)

This last definition embodies a concept quite different from that of some of the others. The concept referred to is that of habit, with the accompanying explicit understanding that attitudes can and should be studied according to the system of laws devised by the behavior theorists. In contrast to them are those who argue that attitude structure and modifications should be viewed in the light of one of the several consistency theories, such as those of Heider (1958), Osgood and Tannenbaum (1955), Festinger (1957). The basic principle in each of these theories is that a change in any one of the three major components of the attitude will tend to effect change in the others until balance, or congruency, between them is reached. Thus, for instance, if the affective component is modified, it will be necessary for the cognitive component to be modified to restore balance; or the attempt at modification must be rejected out of hand; or the attitude will change.

Attitude structure or organization

The more generally accepted conceptualization of attitudes holds that they are not simple constructs but are complex and multi-dimensional. Again, as with the variety of definitions already cited, the literature offers a variety of attitude structures. However, there seems to be more or less explicit in the majority of these structures the understanding that attitudes have at least three basic components. These are a cognitive component, an affective component, and an action tendency or behavior component. Attitudes are also usually considered to vary along several dimensions, and thereby can be distinguished from other attitudes. They may be said to have directionality or valence; intensity or strength; precision, that is, how clearly structured they are or how well organized; multi-plexity, which refers to the number and variety of elements making up any one component; and salience, the relative position of an attitude among the individual's constellation of attitudes.

Investigations attempting to change attitudes have led to conceptualizations concerning the manner in which the components of an attitude are related. According to behavior theory, a stimulus aimed at one of the components may produce a change in it, which may then be generalized to other components so that they are affected in like manner, or in like direction. Hovland (1953) describes attitudes and opinions in such fashion that they resemble other's descriptions of an attitude's affective and cognitive components, respectively. He further describes them as having a high degree of mutual interaction, so that changes in the "attitude" may effect changes in the "opinion." Opinions are characterized as being "verbal" and "implicit responses," which is here interpreted as being very similar to the concept "cognitive component," and attitudes are characterized so that they resemble the "affective component," as used by such writers as Krech and Crutchfield. Thus, when Hovland states that "...one of the main ways in which communications give rise to changes in attitudes is by changing such verbal responses." (1953, p. 8), it seems safe to assume that they are attempting to explain a process which the consistency theorists have considered in terms of strain toward cognitive balance.

Rosenberg (1960) maintains that confirmation of the strain toward congruency process can be obtained by demonstrating that the components covary in close relation to each other. In support of this argument, he has cited Carlson's

(1956) experiment in which subjects were tested for their cognitive and affective responses toward a social object, both before and after cognitive manipulation. It was found, on second testing, that not only did the subjects experience a significant change in cognitions about a social object, but also a concomitant change in affect toward it. To illustrate the reverse side of the coin, Rosenberg conducted an experiment in which he demonstrated that causing a change in affect toward an object would produce a change in cognitions related to it. He selected a group of subjects who were capable of entering deep hypnotic trance. While in the trance state, subjects were told that upon awakening they would have exactly the opposite feelings about an attitude object for which they had been pretested for both cognitive and affective responses. Retesting in the immediate posthypnotic period revealed marked changes in both affect and cognitions. After an interval of about one week, the subjects were released from the posthypnotic suggestion and tested again. At this time most of the subjects reverted to their original affect positions; and, although some altered cognitions persisted, all but one subject's general cognitive structure also reverted to support of the original affect.

To the above formulations Sarnoff and Katz (1954) add "frame of reference," and describe the relationship between it and the cognitive object and the set of values to which the cognitive object is referred. They state that "... the frame of reference is the cognitive set of standards operative at the moment which results from all the forces playing simultaneously upon the individual and which determines the dimension for making the judgments and the specific judgment made ... The frame of reference is also determined by the characteristic way which the individual has of evaluating certain objects and by his emotions and needs at the time." (pp. 116-117). This concept is important to the present study because it includes the effect of a personality characteristic; and this type of variable is also a feature of the present study.

As mentioned earlier, attitudes are of interest to the student of behavior because they are conceived of as mediating behavior. Green (1954) considers attitude, like other psychological variables, as a hypothetical or latent variable. "In general terms a latent variable is used to describe the consistency or covariation of a number of different responses to stimuli of the same general class. The variable is viewed as mediating the stimuli and the responses." (p. 335) Although, as Green points out in this same article, attitude research is often concerned with relationships between an attitude and some other variable such as socio-economic status, education, or other attitudes, it is safe to say that attitudes are studied primarily because they are considered to be keys to understanding and predicting behavior. However, researchers have long found it difficult to establish significant correlations between attitudes, as usually measured, and behavior thought to be mediated by these attitudes. This lack of apparent relationship has frequently been explained by arguing that many influences are impinging upon the individual at the same time that a specific attitude is thought to be in operation. Many investigations have been made in attempts to establish and identify these influences. Usually they are designed to observe attitude changes assumed to be the consequence of manipulating one or more of these variables. Generally speaking, these studies are concerned with three sets of variables: the content of the communication attempting to elicit or change the attitude; the form and manner in which the communication is presented; and the characteristics of the individual (Jarrett and Sherriffs, 1953). The first and last of these has more pertinence to this study than does the second one, which will be mentioned only briefly.

The form and manner of presenting the communication

Several dimensions of the variable, "form and manner," have been explored in an attempt to determine the importance of the influence of these dimensions on attitude change. The effect of the form in which the communication is presented was studied by Jarrett and Sherriffs (1953), Hovland and Mandell (1952), and Thistlethwaite, deHaan, and Kamenetsky (1955); the effect of the order of presentation of the elements of the communication has been investigated by Cromwell (1950), and Lund (1925); and others have observed such aspects of the communication as humor, one-sided versus two-sided presentation, and the differential effects of printed versus radio versus television media.

The content of the communication

This characteristic of the communication has probably received more attention than all the others. Content can be aimed at either the rational or the emotional processes of the receiver. Put into terms that have been used to describe attitude components, these are either cognitive or affective appeals. Probably both of these aspects of the content are present in all communications. However, under experimental conditions, one or both of them can either be held constant or varied. The literature contains quite a large number of studies emphasizing one or both of these approaches to the problem. A few examples will be discussed below.

One of the often-quoted studies in the field of attitude change is that of Coch and French (1948). This study was conducted in an industrial situation where the management had previously experienced difficulty in persuading employees to change from one job to another within the same plant; and the employees had difficulty adjusting to their new jobs. The management approach to the employees had been mostly one of assuring them that there would be no loss of pay in such transfers; but this argument had failed to satisfy the employees. Coch and French actually used more than one attack on the problem. The one of importance to this study concerns changing the cognitions of the employees who were going to be transferred. The experimenters explained the reasons which made the change necessary. They also held small group meetings of employees in which the employees were invited to share in the decision-making process concerning which individuals would be transferred. All of this was interpreted as having two effects on the employees that contributed to their changing their attitudes toward being transferred. It was claimed, that by altering the employees' cognitions, that they gained understanding and therefore were more able to accept the communication. Also, having been involved in the decision-making process enabled the employees to identify to some extent with management and thereby develop some sympathy for management's position.

Another study in which the cognitive aspects were the principle independent variable was that of Carlson (1956). He states that:

> This experiment was designed to test the hypothesis that attitudes toward an object, or situation, may be changed through altering the person's perception of the significance of the object as a means for attaining valued goals. (p. 261)

Carlson made his attempt at altering perception --- that is, altering cognitions --- with two procedures. The first was presented to subjects as a "test of objectivity," a test of one's ability to take a certain viewpoint and support it logically and objectively regardless of one's own viewpoint. It was presented as a small experiment illustrating scientific method. The other change procedure consisted of prepared discussions of the four principle propositions in the test. The discussions attempted to make clear several important and reasonable points which would be accepted by the subjects and which demonstrated the instrumentality of the attitude object. His subjects were 183 students in introductory psychology classes at the University of Michigan. He found that his experimental procedures made a significant change in the attitudes of those subjects with moderate initial attitude on the issue; subjects who were extremely prejudiced or extremely non-prejudiced did not manifest significant change.

Probably the largest group of studies done on the effect of the content of the communication on change of attitudes was that done by Hovland's group during World War II and reported by Hovland, Lumsdaine, and Sheffield in their book, Experiments on Mass Communication, (1949). They report that their results were generally disappointing; that the various methods they used of presenting material to soldiers resulted in increasing the subjects' fund of information, but apparently had very little effect on their attitudes. They did observe some instances of the "sleeper effect." When subjects were retested nine weeks after the first communication, they were found to have experienced up to 50 per cent loss of memory of the factual content of communication, but in some cases to have experienced a positive increment of change in the related attitude. The authors offered several suggestions as to why the communications failed to change attitudes. One suggestion was that the desired attitudes were held already, and consequently, little or no change could be noted. Another was that the communications were designed principally to give information, and that they lacked proper emotional appeals to motivate audiences to change attitudes.

Perhaps the concern over lack of proper motivational appeal in their communications led to the seminal experiment of Janis and Feshbach several years later. The purpose of the study was to investigate the "effects of fear-arousing communications" (Janis and Feshbach, 1953). This study is an example of the use of the negative emotional appeal; that is, the emotion-arousing material in the communication was selected to threaten receivers of the communication with dire consequences if they did not adhere to the recommendations advocated. As pointed out by the investigators, this type of appeal has been and is frequently used in an effort to influence attitudes and behavior. They state:

> Our interest in such attempts is primarily that of determining the conditions under which the arousal of fear is effective or ineffective in eliciting changes in beliefs, practices, and attitudes. (p. 78).

The assumption in the use of fear appeals is that under the emotional tension which they produce, the audience will be highly motivated to accept the recommendations of the communicator. However, the authors were aware, from clinical studies based on patients' reaction to psychiatric treatment, that under certain conditions some kinds of defensive reactions may be brought into play by the audience which would result in responses quite different from those desired by the communicator.

The communication used in the Janis and Feshbach experiment was a fifteen minute lecture on dental hygiene. The content of the talk was the same for all experimental groups, but the amount of threatening or fear-arousing material presented to each of the groups was varied. Besides using verbal material, the investigators also presented slides of photographs which portrayed tooth decay and mouth infection. Quite vivid and highly realistic ones were presented to the "strong appeal" group; milder examples were presented to the "moderate" group; but only x-ray pictures, diagrams of cavities, and photographs of completely healthy teeth were presented to the "minimal group." A control group was given a similar lecture on the structure and functioning of the human eye. Subjects were 200 high school freshmen, approximately fifteen years of age. A pretest was given the subjects one week prior to the illustrated lecture. This test was presented in the form of a general hygiene questionnaire and the key items concerning dental hygiene were intermixed with the others. Immediately after the talk, subjects were requested to fill out a questionnaire designed to elicit data on the amount of information they acquired, their attitudes toward the communications, and their emotional reactions. It was found that the three levels of fear-arousing appeal had produced different degrees of emotional arousal in the subjects.

The effect of the fear-arousing appeal on the attitudes and behavior of the subjects was measured in two ways. A follow-up questionnaire, administered one week after the talk, was designed to measure changes in dental hygiene practices, beliefs, and preferences. The direction and amount of these changes of attitude were further substantiated by observing the subjects' resistance to "counterpropaganda." This counterpropaganda was a short statement, supposedly based on dental authority, which contradicted some of the recommendations presented in the illustrated lecture. It was inserted into the follow-up questionnaire. These measures gave evidence of a significant inverse relationship between the strength of fear-arousing appeal and the amount of change in attitude and behavior. Interpreted as a change toward conformity to the dental hygiene recommendations, the control group showed zero per cent change, the strong group 8 per cent, the moderate group 22 per cent, and the minimal group 36 per cent net change. There was a statistically significant difference between the minimal and control groups, and between the minimal and strong groups, but not between any of the others. It was discovered that the illustrated talk was equally effective in all three of its forms in imparting information. The investigators state that:

> The main conclusion which emerges from the entire set of findings is that the overall effectiveness of the persuasive communication will tend to be reduced by the use of a strong fear appeal, if it evokes a high degree of emotional tension without adequately satisfying the need for reassurance (p. 92).

The reliability of the method of investigating behavior change may be questioned, since change was "observed" in the form of verbal report of the subjects, and not by actual observation of the behavior of the subjects. The implication that "adequate reassurance" will counteract the aroused emotional tension may also be questioned. Since this assumption was not tested in their experiment, it leaves open to further speculation the reasons for the differential responses of the several groups. This is not to question the validity of Janis and Feshbach's results; they have been supported by the results of Carlson (1956), Linton and Graham (1959), Berkowitz and Cottingham (1960), Janis and Terwilliger (1962), and Janis and Milholland (1954).

As noted above, the behaviorists consider attitudes as habits and therefore within the jurisdiction of the laws of learning theory. Janis and Milholland (1954) performed an experiment very similar in general design to the one of Janis and Feshbach, except that their purpose was to investigate the effect of a fear-arousing appeal on immediate recall of learned material. They used two equated groups of subjects who read short communications. The communication read by one group contained a strong threat appeal. An equivalent communication read by the other group contained a minimal appeal. The content of these communications was based on the material used in the illustrated talks in the former experiment. Immediately after the reading of the communication, the subjects were asked to write out as much as they could recall of what they had read. It was found that there was no significant difference between the mean number of items remembered by the two groups. However, the nature of the items recalled by the two groups was quite different. The group which read the communication with the minimal appeal tended to remember more items related to the cause of the threat, while the group exposed to the strong appeal tended to remember more items related to consequences of the threat. (These results are interpreted as demonstrating that the more threatening material will be better remembered, but the emotional tension produced by it will distract the subjects from remembering other material in the communication.)

These findings are in direct contradiction to Janis and Feshbach's conclusions above. They reported that "the three forms of communications were found to be equally effective in teaching the factual material on dental hygiene as measured by a comprehensive information test given immediately after exposure to the communication." (1953, p. 88). Janis and Feshbach interpreted the findings as having a beneficial effect on attention and learning. They caution that this may have been partly due to the fact that their subjects were a "captive" audience, and that in this situation selective attention to the communication was not possible. However, the literature does not offer conclusive evidence that selective attention fails to operate in a "captive" audience. The question arises as to what they would have found if they had made a breakdown of responses to types of items, as was done in the Janis and Milholland experiment.

Janis and Feshbach (1953) have suggested three forms of "resistance" which might help explain the differential responses of the minimal, moderate, and strong appeals. These resistances are reported to have been observed in psychotherapy; and it is suggested that possibly they are operative in "normal" people who are exposed to mass communication which might lead to arousal of fear or anxiety. The three resistances are (a) inattentiveness during the communication session, (b) rejection of the communicator's statements motivated by reactive aggression, and (c) subsequent defensive avoidance motivated by residual emotional tension. As was implied above, the authors felt that inattentiveness was not a factor contributing to their results. They also felt that it was unlikely that reactive aggression caused rejection of the communicator's statements; and they conclude that subsequent defensive avoidance is the more likely explanation of the outcome of their study.

If the above conclusion can be accepted, then the question can be asked why the net change in the strong appeal group was a positive one? Why was it not zero, or negative? A partial explanation might be found in individual differences. If there were marked individual differences in manner of responding to strong fear appeal, this suggests that a personality characteristic, or predisposition, might be a key to the answer. A further search of the literature disclosed that a number of studies had been designed to investigate this possibility.

Characteristics of the individual

Hovland, Janis, and Kelley (1953) report that a pioneer investigation was carried out by Mussen (1950). The study was conducted in an integrated summer camp where the effects of direct interracial contact on children's attitudes were observed. Attitude changes were measured with the Horowitz picture test, and personality data were obtained from a modified form of the Thematic Apperception Test. It was found that boys who registered an increase in prejudice also manifested a greater need to defy authority and to express strong hostile feelings, at the same time expressing a high degree of concern about the consequences of aggressive behavior.

In a later report, Janis and Feshbach (1954) revealed that their high school subjects were given a personality inventory before they heard the illustrated talk on dental hygiene. This inventory, which was designed to elicit the presence of anxiety symptoms, included twelve questions dealing with hypochondriacal complaints and physical symptoms of chronic anxiety. This inventory was arranged as a Likert-type scale with response points ranging from "very often" to "practically never." Subjects who scored in the upper 40 per cent of the total group were arbitrarily classified as "high anxiety"; the remaining 60 per cent was classified "low anxiety." It was predicted that regardless of other considerations with respect to persuasibility in general, the high-anxiety subjects would be more predisposed to resist a communication with a strong fear appeal than would low-anxiety subjects.

The personality data were compared with the attitude change data with the following results:

> (a) The high-anxiety subjects were consistently less influenced by the strong appeal than were the low-anxiety subjects; (b) among those exposed to the minimal appeal, the high-anxiety subjects were significantly more influenced than the low-anxiety subjects with respect to dental hygiene practices and were equally resistant to counterpropaganda; (c) on both attitude change criteria, the differences between high- and low-anxiety subjects were greater in the case of the strong appeal communication than in the case of the minimal appeal communication. On one of the criteria (changes in dental hygiene practices), the second order difference was large enough to be regarded as statistically significant (pp. 165-166).

These results were interpreted as tending to support the hypothesis that a relatively high degree of fear or anxiety aroused by a persuasive communication will cause the recipient to respond with defensive reactions which interfere with the acceptance of the message. It is, therefore, possible to assume that anxiety was a factor contributing to the behavior of those boys in Mussen's study who increased in prejudice after a period of interracial contact.

As noted above, the only behavior changes recorded by Janis and Feshbach in their original experiment were not directly observed by the experimenters. While there is no strong reason to discount this data, it does not demonstrate unequivocally that there is a relationship between anxiety level, attitude change, and related behavior change.

Some investigations have shown what appears to be a definite relationship between performance and the same type of personality variable observed above. In an unpublished dissertation, J. L. Fine reported an attempt to develop an adequate criterion of driver behavior, defined as a driver's judgments and decisions, and to investigate the relationship of certain personality factors to that activity. Among other things he found that:

> A state of high anxiety while operating a motor vehicle may result in inadequate psychomotor coordination, rigidity rather than plasticity of response patterns, and erratic manipulation of the vehicle. (1964, pp. 12-13).

His results also revealed a linear and inverse relationship between effectiveness of driver behavior and authoritarianism, level of anxiety, and amount of fantasy.

Beamish and Malfetti (1962) have reported a study in which they attempted to identify psychological characteristics which would discriminate between violators and nonviolators of traffic ordinances. Violators were defined as individuals who had incurred two or more traffic violations (N = 84); nonviolators were individuals who had operated a motor vehicle one or more years under license and without having an accident (N = 186). The subjects ranged in age from sixteen to nineteen years. They were given a battery of psychological tests which revealed that members of the violator group rated significantly lower on the characteristics of emotional stability, conformity, objectivity, and mood. They also rated higher, but not significantly so, on psychopathic deviation, impulsivity, and ascendancy.

Benton *et al*. (1961) have reported a study attempted to establish useful criteria for predicting driver fitness. Their subjects were a group of amateur sport car racers who were evaluated on four factors thought to affect fitness. These factors were physical condition, a psychological characteristic, ophthalmological condition, and reaction time. Data from an index of safe driving were compared with these factors; and it was found that psychological testing had the most value in differentiating between safe and unsafe drivers. The psychometric instrument used was the DF Opinion Survey of Guilford, Christensen, and Bond, which purports to identify and measure ten discrete aspects of motivation. Drivers with extreme scores on this survey were observed to commit a greater number of driving errors. The results were interpreted as definite indications that the drivers who commit the most driving errors reject social customs, are deficient in ethical awareness, like to take personal risks, and are interested in abstract thinking.

The problem of relating attitude change to behavior change *

The studies referred to above are examples of efforts to relate personality characteristics to attitude change or to behavior change, separately. The Mussen and the Janis and Feshbach studies seem to have established a relationship between the differential levels of a personality variable and changes in attitude. The Fine, the Beamish and Malfetti, and the Benton studies give evidence for predictable relationships between personality characteristics and effectiveness of behavior. The question almost asks itself: what might be found if attitude and related behavior are observed while levels of predisposition and fear-arousing communications are varied?

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*In the following discussion, as well as throughout this report, the term attitude will be used to refer to a predisposition to behave in a consistent way toward a specific attitude object; the term personality trait (or characteristic) will refer to a predisposition to behave in a certain way in many diverse situations; the term behavior will refer to overt acts.

With the exception of Janis and Feshbach's (1954) study, no report was found in the literature of an attempt to investigate the change in behavior that may follow a change in attitude effected by a fear-arousing communication. Cohen (1964) repeats the complaint of nearly everyone who has written on the general subject of attitude change. He notes that there is wide acceptance of the assumption that attitudes mediate behavior; but most of the attitude studies seek only to show how attitudes may be manipulated or how they may be related to other aspects of the individual. Very little work has dealt with the relationship of attitudes, as usually measured, and behavior mediated by them. The difficulty of designing a practicable experiment to investigate this relationship may explain why such experiments are seldom done, or seldom reported. A "real-life" study would be prohibitive in cost for most investigators; a laboratory study has the difficult problem of providing ". . . effective analogues of postulated processes in the naturalistic phenomena . . ." (Lazarus, 1964, p. 400).

Theoretical and practical considerations

Several considerations must be dealt with if an experiment is to constitute an "effective analogue." The first to be dealt with here is the concept of psychological stress and its measurement. Lazarus (1964) has expressed the opinion that the concept of stress has most often been handled carelessly in psychological experiments. Therefore, care should be taken that the stimulus selected will produce a stress reaction. The stimulus should be manipulated experimentally so that the assumption of stress production is substantiated. As a matter of practicality, it would be advantageous to select an attitude for which a suitable scale is available. The selection of a personality correlate would depend on the theoretical assumptions concerning the impact of the threat (or stress) employed, and various responses to it that might be expected from people on the basis of known variability in personality traits. Devising a suitable behavioral measure probably presents the greatest difficulty. Its content should not only be as similar as possible to that of the scale used to measure the attitude, but it must also be within the realm of practical possibility.

Possible implementation of the foregoing requirements were first suggested by an article by Schwartz (1964)*, which included a report of the failure of two massively organized and highly publicized campaigns for safe driving. The first was the December 1, 1955, "Safe Driving Day," a long planned, widely heralded effort sponsored by a presidential committee, with more than two hundred cooperating national organizations. This was the nation's most massive attempt at an emotional approach to traffic safety. Unfortunately, the death toll climbed 10 per cent on "Safe Driving Day." The other emotion-based effort reported was the 1960 one-hour CBS documentary, "The Great Holiday Massacre." This show featured screaming sirens, injured children, sheet-covered victims, and other emotion-laden scenes. A subsequent audience poll by the National Safety Council found that there was a decline of 50 per cent in the number of people who felt personally involved in the automobile accident problem. Most viewers would not personally identify with the gore, and instead transferred their feelings of involvement to certain bad drivers featured in the show. The repeated use of fear-arousing appeals to change driving attitudes and behavior in the face of frequent failures of such campaigns is evidence that there is widespread and strong faith in the efficacy of scare propaganda.

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*It was discovered subsequently that this same article had been published in Harper's Magazine, October, 1963.

The results of the two safety campaigns appear to confirm Janis and Feshbach's laboratory findings concerning the effect of fear appeals on attitude change. It is also possible that the communications might have contributed to the increased death toll on "Safe Driving Day." However, there are so many possible contributing factors to the happenings in traffic on any one day, that it would be rash to draw conclusions from such evidence. What the results do suggest is that experimental evidence of a similar nature should be sought. This suggestion prompted the undertaking of the present experiment.

Driving safety was chosen as a means of studying attitude and behavior change because it provided three avenues for investigation within one experiment. The primary one was the apparent possibility of designing and carrying out a study in which could be observed the relationship between the changes in an attitude and its supposedly mediated behavior. Also of appreciable interest was the fact that the effects of fear-arousing appeals has been the subject of a good many studies of safety attitudes. The practical applicability of the results of such an experiment was a lesser, but not unimportant, consideration.

The subject of driving safety is quite a popular one, and many articles have been written stressing the importance of the driver's attitude upon his safety and that of others on the road. Evidence of a commonly held conviction that the driver should be the principal focus of attention in safety campaigns is found in a variety of places. Benton _et_ _al_., writing in the _Journal of the American Medical Association_, state that:

> As deaths and injuries from motor vehicle accidents continue to mount, it becomes increasingly apparent that the only really

> effective means of minimizing this slaughter must deal with the automobile drivers themselves. (1961, p. 419)

The American Automobile Association's publication How to Drive (1957) states that the majority of accidents are driver-caused, and that the drivers' attitudes are of paramount importance. Lauer and Pawlowski (1962) devote a section of their book to emphasizing the importance of attitudes, and to the effects on driving behavior of the mishandling of personal emotional problems. The New York University's Center for Safety Education textbook, Man and the Motorcar, has a chapter on personality traits and their influence on driving behavior. Haddon *et al.* state that:

> There is every reason to believe that individual and public attitudes play a significant role and that programs directed at prevention of accidents of many types will need to be based, in part, on techniques that change the attitudes of the individuals involved. (1964, p. 483)

No more than a cursory glance through the literature on safety, and especially on driving safety, will reveal a variety of suggestions and opinions on how attitudes are related to driving and what might be done to change these attitudes in a desirable direction. One of the more earnest attempts of this sort is Brody's article, "Accidents and Attitudes" (1959) . However, there do not seem to have been many studies investigating directly the actual relationships of the attitudes and the behavior of drivers, nor the means necessary to change these attitudes and behavior. Haddon (1964), Mendelsohn (1964), and others express surprise at how little research has been done on driver attitudes.

Expressions of this belief in the importance of the driver's attitude, and the necessity of focusing on it in safety education, is not limited to articles in popular and scientific journals. The safety education department of many states' highway patrols and many traffic courts subscribe heartily to this thesis and incorporate it as a central feature of their programs. So do a great many major motor transport concerns. One of the most interesting results of this conviction is Highway Safety Foundation, Inc. This is a non-profit organization sponsored by a group of earnest and well-meaning citizens of Ohio. The purpose of their organization is the production and distribution of shock-type films on the assumption that the viewing of them will have a significant positive effect on driving safety attitudes. One of their several films is claimed to have been shown to nearly twenty million people.

Planning the experiment

The availability of a driving simulator made possible a study attempting to discover relationships between fear-arousing communications and attitude and behavior change. With the simulator it seemed reasonable to assume that an adequate analogue of driving behavior might be brought into the laboratory, and that reliable observations of changes in driving behavior could be made. It is recognized that the simulator has limitations insofar as exact imitation of driving is concerned; but the possibility of getting objective measures of behavior from different groups of subjects in the same situation were much better than could be hoped for in any other driving situation. No report was found in the literature of the use of driving simulators for this kind of study.

The search for an adequate form of fear-arousing communication ended with the selection of motion pictures about driving safety. These were chosen for several reasons. First, the literature gives ample support to the use of movies as stress producers. Lazarus _et al._ (1962) demonstrated that a motion picture could be a stress producer especially if the narration accompanying it contained warnings which the audience could perceive as threat (Janis, 1962). The Lazarus experiment also found that responses to the movie were related to the peculiar type of ego-defense mechanism employed by the subject (Lazarus, 1964, p. 409). Further affirmation that material presented in motion pictures can be stress producing can be found in Zuckerman, Lubin, Vogel, and Valerius' (1964) study in which they found that viewing scenes of the operation of an abbattoir produced significant changes in anxiety level as measured by the Multiple Affect Adjective Check List (Zuckerman, 1960). As for the use of movies as a means of changing attitudes, the literature is not too encouraging. Peterson and Thurstone (1933) participated in an extensive research program in which part of the effort was to assess the effect movies had on young people. They attempted to measure changes induced by various motion pictures on attitudes toward war, other nationalities, etc. Although they found some significant changes, they were not of a very high order. Even more disappointing were the efforts of Hovland's group in trying to produce changes in attitudes held by soldiers in World War II (Hovland, Lumsdaine and Sheffield, 1949). They found that the several types of communications employed, including movies, were quite successful in imparting information; but sound evidence of attitude change was meagre.

An incidental argument for the use of driving safety movies for the fear-arousing communications is the extremely widespread use of them in safety programs. They offer an immediately available mode of communication that can be used most conveniently in the driving simulator. Also, in the past few years, there have been appearing more and more criticisms of the use of the more gory ones, especially when they are shown in more or less isolated propagandizing situations and not as part of an organized positive educational program. However, apparently the majority of safety workers still believe strongly in the efficacy of these appeals under any circumstances.

Many studies have been conducted in an effort to identify personality predispositions that can be used as predictors of driving behavior. At best the findings are inconclusive. Perhaps not enough work has been done; perhaps there has been too much faith put in the expectation that some trait or cluster will in itself reveal the kind of driver a person will be. So far, most of the significant relationships have been of a rather low order of correlation and can be assumed to contribute only in a small way to effectiveness of behavior, or to attitude change (Cohen, 1964). However, it still remains to be demonstrated what effect an extreme threat would have on drivers' attitudes and behavior, and especially on drivers whose personality predisposed them to behave ineffectively under such stress. Those studies which have findings somewhat in common reveal that persons who score high on scales measuring authoritarian characteristics tend to reject threat appeals and also to drive ineffectively. Linton and Graham (1959) have offered evidence that under non-threat conditions individuals high in authoritarian characteristics tend to change attitude in compliance with the communication. Janis and Feshbach (1954) showed that subjects with high levels of anxiety resisted the changes advocated by a fear-arousing communication. Fine (1964) discovered an inverse linear relationship between effectiveness of driver behavior, levels of fantasy and anxiety and scores on selected items from the California F Scale.

On the basis of the above and other reports, it was felt that the cluster of traits called authoritarianism would most likely be related to attitude and behavior change induced by fear-arousing communications. The search for an instrument to measure authoritarianism resulted in the selection of the Pensacola Z Scale. It was chosen because it was reported to correlate adequately with the F Scale, but to be free of items of political particularity (Jones, 1957); and it had not been used in this type of study before. Also, its norm group of aviation cadets was assumed to be similar to the subjects expected to be used in the present experiment.

The present experiment was designed to observe the differential effects of a fear-arousing, driving safety communication on safety attitudes and driving behavior in relation to different levels of the personality trait Heteronomy. A control group and three levels of fear-arousing appeal were planned; the Pensacola Z Scale (Jones, 1957) was used to distinguish between subjects who were high, low, or average in Heteronomy (authoritarianism); the Siebrecht Attitude Scale (Siebrecht, 1941a; 1941b) was employed to measure changes in subjects' attitude toward driving safety; and the Allstate Driving Simulator was used to observe and measure changes in driving behavior.

On the assumption that attitudes and related behavior could be changed by fear-arousing communications, and that change would be mediated by subjects' general predisposition to respond to threat, the following predictions were made:

(1) As threat intensity increases, the amount of measured change in the attitude will decrease.

(2) As threat intensity increases, the behavior will become increasingly ineffective.

(3) Under high threat conditions, subjects with a predisposition to reject threatening appeals will change their attitudes less than subjects without such predispositions.

(4) Under high threat conditions, subjects with a predisposition to reject threatening communications will increase in ineffectiveness of behavior.

As an additional matter of interest, the data from the responses of the male subjects will be treated separately from those of the females. Kimmel and Hill (1961) have found that the base skin conductance level of men changes more under stress than does that of women; Zuckerman et al. (1964) have found that the anxiety level of women increases more than does that of men on being exposed to a movie about a slaughter house; and Janis and Field (1959) have found that the magnitude of women's responses to threat is less well correlated with supposedly predisposing personality traits than is that of men. In view of these apparently contradictory findings, and the popular concept that women's behavior will deteriorate more under stress than will that of men, the performance of these two groups will be examined and some speculations offered to explain them.

METHOD

An experiment was designed to observe and test the differential effects of "Heteronomy" and the intensity of fear-arousing appeals on changes in attitude toward driving safety and on changes in simulated driving behavior. The Pensacola Z Scale was employed to measure the personality characteristic, "Heteronomy"; the Siebrecht Attitude Scale was used to observe changes in attitude toward driving safety; a test in a driving simulator was used to observe changes in driving behavior; and selected movies were used to present safety appeals with varying degrees of fear arousal. Base skin conductance measures were taken on all subjects to verify that the movies produced different levels of arousal. The materials used will be described before a detailed discussion of the experimental design.

Materials and Apparatus

The following instruments were employed in the experiment:

Pensacola Z Scale
Siebrecht Attitude Scale
The Allstate driving simulator
Four movies:
    (1) Volcanos in Action
    (2) At Home at the Wheel
    (3) Accident Scene
    (4) Mechanized Death
Galvanic skin response apparatus
The National Test in Driving Education

The Pensacola Z Scale (Jones, 1957) was constructed to measure authoritarianism. The author states that an attempt was made to design a substitute for the California F Scale which would measure the same characteristics but would be free of political particularity and concern for contemporary social groups and policies. Although the Z Scale was designed to measure the same characteristics as the F Scale, the characteristic measured by the Z Scale has been termed "Heteronomy," instead of authoritarianism, which was considered to have become inseparably associated with the F Scale. According to the author, "Heteronomy" represents a cluster of traits which he has labeled dependency, rigidity, anxiety, and hostility. The 66 items of the scale are pairs of statements arranged in forced-choice fashion, using materials as purely personal as possible. The Z Scale correlates +.43 with the California F Scale, and has a 24-hour retest coefficient of +.87. On the basis of results of tests to determine whether scores could be influenced by a particular "set" given the subjects, the scale is considered unfakable. The author's norm group was a sample of 766 naval aviation cadets. Their scores had a mean of 35.51 and a standard deviation of 6.32.

The Siebrecht Attitude Scale (Siebrecht, 1941a; 1941b) is a Likert-type scale of 40 items. Subjects are asked to respond on a five-point scale from "strongly agree" through "uncertain" to "strongly disagree." The scale points are given values ranging from 5, for the greatest conformity to driving safety values, to 1 for no conformity. An increase in score is assumed to indicate a change in attitude toward greater conformity to driving safety. The author claims a split-half method reliability of .81 ± .02 PE which was secured on a group of 100 students enrolled in driving training courses. He states that the validity of the scale rests upon the following bases:

> 1. The judgment of experts in traffic safety and attitude measurement were utilized to determine the factors which are believed to be important in safe driving of the automobile and to evaluate the statement of opinion which comprised the preliminary form of the scale.
>
> 2. In the final form of the scale have been included only those statements which differentiated significantly between the mean scores of high- and low-score groups of students; a 20 per cent segment of the extremes was used. For none of the statements is the critical ratio of the difference between the means of the 20 per cent segments less than 3.00. The average ratio is 6.234. (Siebrecht, 1941 b)

The driving simulator is a product of the Link division of General Precision Corporation.* Its design and manufacture were sponsored by the Allstate Insurance Company. The machinery is installed in a large house trailer and is self-sufficient except for an electrical power supply.

The simulator used in this experiment had eight driving stations, or "cars," so that a maximum of eight subjects could be observed at one time. Each station was equipped with regular automobile controls and instrument panel, all of which could be operated and observed as in a real automobile. The controls and instrument panel design was very similar to that of several General Motors products. The system was operated as if the cars were equipped with automatic transmission.

The cars were arranged in the trailer so that the drivers could see a movie screen on which was projected the driving situations. These were films, in color and sound, apparently taken from inside an automobile with the camera lens at the approximate position of the driver's head. All scenes had in their immediate foreground the hood of the automobile, the rear view mirror, and part of the window framing of the car, making a very realistic impression. Instructions and explanations were "dubbed-in" voice. The subject was told to follow the instructions in the movies and to operate the controls of the simulator as if it were a real automobile actually being driven in the situation shown in the movie. The subject could in no way control the situation in the movie that he was watching, but could only follow with his car and make appropriate responses to situations as they arose. The film was coded so that the driver's behavior was monitored during selected sequences of the movie. When the driver made an error, this error was automatically recorded on electrically operated counters. This necessitated an auxiliary bank of counters being spliced into the circuit for steering and braking which would accumulate scores greater than any likely to be made by a subject. There was no evidence that this spliced-in bank of counters interfered with the working of the rest of the mechanism.

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*This driving simulator was designed for and is used as a training aid in driver education courses in junior and senior high schools. It was owned jointly by the University of Florida and the Alachua County Board of Public Instruction. It was made available without charge to the experimenter on a part-time basis for use in this experiment.

The various fear-arousing appeals were presented in four movies. The movie shown to the control group was an Encyclopedia Britannica Education Series release entitled Volcanos in Action. It was in black and white and ran for eleven minutes. Its content consisted of a simple geological explanation of the mechanism of volcanism and a number of interesting photographs of several types of volcanos in action.

The movie used for the minimal treatment level group was a fifteen minute black and white production of the General Motors Corporation entitled At Home at the Wheel. It might be described as an interesting account of the typical suburban family's daily experiences with the automobile. The theme of the movie appeared to be emphasizing the importance of planning ahead in driving in order to improve driving efficiency and to avoid crises.

The movie selected to be shown to the moderate intensity level group was a nine minute International Film Bureau production in color and sound, entitled Accident Scene. This movie consisted of a series of highway accident scenes interspersed with narration whose content was aimed at making a personal appeal to the driver to adopt proper attitudes about safety so that accidents such as were depicted in the movie would not happen to him. Not more than a third of the content of the movie consisted of accident scenes and these were not unusually disturbing. The rest of the movie consisted of pictures of statistical charts and graphs and scenes of the narrator lecturing to the audience. An advertisement for the film emphasizes that the movie contains scenes of fatal accidents photographed minutes after the tragedies occurred. These are said to provide a series of jolts which should shock the most indifferent driver into a desire to improve his driving technique. Motivation rather than instruction is the aim of this film.

The fourth movie, shown to the strong intensity level experimental group, was entitled Mechanized Death. This film was produced and distributed by Highway Safety Foundations, Inc., of Mansfield, Ohio. It is in color and sound and runs for approximately twenty minutes. This is one of a series of highway safety films produced in conjunction with Ohio's Highway Patrol. The producers feel that this production will go a long way in helping to eliminate highway deaths. This is a shock-type film. This and other very similar films are used in many traffic courts as part of the sentence of a traffic violator. The commonly held assumption is that they are effective in reducing auto accidents.

GSR apparatus was used to measure emotional response to the movies as reflected in the change in base skin conductance. The method used was that of Kimmel and Hill (1961) with two exceptions: whereas they tested subjects one at a time and recorded results mechanically on moving paper; in the present experiment as many as eight subjects were connected by means of electrodes and shielded cables through a multiple-pole switch to the GSR amplifier. The individual subject's resistance levels were read at three times during the treatment period, and this data was recorded by hand. The readings were made from a scale on the front of the amplifier. Skin resistance was picked up from the palm and back of subject's left hand by 3/4-inch zinc electrodes placed in lucite cups filled with sodium chloride jelly. The current through the subjects was held constant at 42.5 microamps. It was then run through a Hunter DC GSR amplifier. The data from many subjects was made useless or highly suspect because of mechanical problems with the GSR apparatus. In order to arrive at meaningful interpretations of the results, data was used from a random sample of those subjects whose responses were readable. This provided an N of 14 at each treatment level.

The National Test in Driver Education, short form (1961), is a 60-item objective test designed and published by the Center for Safety Education in New York University. Its authors state that it was designed to examine knowledge and reasoning in matters that are significant for safe driving. The subject matter for the test covers a fairly wide scope, generally concerned with major problems in traffic safety. The questions deal with a variety of matters pertaining to practices, rules and regulations, and customs expected to be followed by automobile drivers. The test was designed for testing both high school students and adults. Thirty of the questions are of the true-false type, and thirty are of multiple-choice items with one best answer for each item. There seems to be face validity, but no specific information concerning validity is available.

Subjects

Subjects were 180 quasi-volunteers from introductory psychology classes at the University of Florida. Primary criteria for their qualification as subjects were: (a) that they had operated a motor vehicle for at least one year with a driver's license; (b) that they were between eighteen and twenty-one years of age; (c) that they were not physically incapable of driving an automobile; and (d) that they had not had training in a driving simulator. Both male and female subjects were employed.

Pearson product-moment correlation coefficients were calculated between each combination of sex, driving knowledge, driving safety attitude, and Heteronomy for the purpose of forming matched groups of subjects. However, no significant correlations were found between them, and groups were formed solely on the basis of Z-Scale scores. Within each of the three Heteronomy classifications, subjects were more or less randomly assigned to one of the three treatment levels or to the control group.* Eight male and seven female subjects were obtained for each of the twelve treatment combinations.

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*The assignment of subjects to a specific treatment level, or to the control group, was random within the limits of subject's availability. All

Experimental Design

A 2 x 3 x 4 factorial design was used to test the differential effects of fear-arousing appeals on: (a) attitudes toward driving safety, and (b) simulated driving behavior of subjects differing in Heteronomy. This design involved the two sexes (male and female), three levels of Heteronomy (Autonomous, Average, and Heteronomous), and four levels of intensity of the fear-arousing communications (control, minimal, moderate, and strong).

Heteronomy was varied by selecting subjects according to their scores on the Z Scale. Subjects who made a score of 26 or lower were called "Autonomous," those who made scores ranging from 27 to 37 were called "Average," and those who made scores of 38 or higher were called "Heteronomous." Autonomous subjects were approximately one standard deviation below the sample mean, and Heteronomous subjects were approximately one standard deviation above it (Mean = 31.87; S. D. = 6.29). Problems of availability of subjects made it necessary to place in the Autonomous group two subjects whose scores were 27, and four subjects whose scores were 28, and in the Heteronomous group five subjects whose scores were 37.

The four levels of intensity of the fear-arousing communication were presented by means of the four movies described in the preceding chapter. Measures of base skin conductance (described below) indicate that this manipulation was successful.

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sub-groups were reasonably similar with respect to age and scores on the National Test in Driver Education, the Siebrecht Attitude Scale, and the Pensacola Z Scale.

Procedure

The experiment was conducted in two steps. The first session was a preparatory step to the second, or experimental session.

First session

The first sessions were carried out at several different times with from 10 to 140 subjects attending any one meeting. As nearly as possible, the same procedure was carried out at each of these meetings. Three "tests," folded in a cover sheet, were handed to each subject. On the cover sheet were printed instructions and explanations. The subjects were asked to read these very carefully and to ask for further explanation if necessary. In every group, someone raised a question concerning the second session. The experimenter replied in a set fashion that they would be given tests in a driving simulator, that they would be shown a movie, and that base skin conductance measures would be taken. It was emphasized that no painful stimuli would be used, but that one of the movies that some of the subjects would see might be quite disturbing. In view of the possibility that this movie might disturb some subjects so badly as to make them useless in the experiment, the experimenter requested that subjects report any death in their family, or among their close friends, as a result of an automobile accident. It was intended that unless these subjects fell into a critical group, and were desperately needed, that they would not be used in the experiment. As it turned out, only three subjects objected to seeing this movie, and none of them returned for the second, experimental session.

Another frequent question concerned the amount of time allowed for taking the tests. The subjects were told that none of the tests was timed; that they should proceed from the end of one to the beginning of the next until they had finished; and that, in order to perform their best, they should proceed in a forthright fashion without deliberating long on any one question.

Each subject's name, address, phone number, age, sex, and number of years' driving experience were recorded.

Second session

The second, or experimental, session had to be conducted with no more than eight subjects at a time. Subjects were contacted individually by the experimenter to make appointments for this session. At any one experimental session, all subjects received the same treatment, but there were usually subjects of both sexes representing more than one personality characteristic. For this session, subjects had to be transported from the university campus to the current location of the driving simulator, which was moved from time to time from one of the public school campuses to another. Subjects were met at a prearranged place and transportation was provided by the experimenter.

Upon the arrival at the simulator trailer, subjects were invited to take a seat in any of the cars as they chose, except those that were temporarily out of order, and an informal explanatory talk was given them. Because the explanation and instructions were rather long, this talk was not written out and read, but it followed an outline which was carefully followed without change in every session. The subjects were first told what the sequence of events in this session would be; they were then given a brief description of the simulator and how it was operated. This description consisted of explaining to them that the controls operated in the same fashion as those of an automatic-transmission-equipped automobile. There was one unusual feature; on the "hood" of each car was a small panel containing a group of red lights which flashed to signal errors. Subjects were informed that, in the event they made an error while driving the car, the appropriate red signal for the type of error they made would light and would remain lit until the error was corrected. Practice was given to the group in manipulating the controls and correcting errors, which could be signalled by the experimenter with switches on a control panel. This gave subjects an opportunity to discover beforehand how much brake pressure was needed to avoid a braking error, what degree of turn was needed in the steering wheel, etc. After this practice, the talk was resumed and it was brought to the attention of the subject that although the simulator was in many respects quite like an automobile, that in some respects it would not behave as they were accustomed to an automobile behaving, and that they should approach the problem of operating it as best they could so as to make as few errors as possible. It was further pointed out to them that it was quite possible to "fake" some of the driving behavior, and they were earnestly requested to join into the activity with reasonable earnestness and seriousness.

Next, a short description of the introductory movie was given. Briefly, this was to the effect that they were to watch the movie and follow all directions given them by the narrator. They were told that a driving-test movie, which in many respects would be similar to the introductory movie, would follow; and that they were again to follow the directions that were given in the movie. Following this they would see a movie about safety (or volcanos). A description was given of the GSR apparatus and how it would be attached to each subject.

Reassurance was again given them that they would receive no electric shock nor any other painful stimulus. The importance of their sitting quietly during the time that the apparatus was attached to them was emphasized, and they were requested not to talk to one another nor indulge in any muscular activity that they could avoid. They were then told that after the electrodes were removed from their hands that there would be a short break; following the break there would be a short paper and pencil test and a repeat of the driving test.

Upon conclusion of the introductory talk, the lights in the trailer were turned down and the first driving-simulator film was begun. This was a fifteen minute instructional movie entitled Start Good Driving, which explained the operations of the simulator controls and took the students through the motions of operating an automobile as if they had never had such experience before. There followed some practice in both city and country driving and in going through the basic maneuvers with the car. As soon as the introductory movie could be rewound and the test movie threaded into the projector, the driving-test movie was begun. This movie entitled Let's Review, was a twenty minute movie designed to test the students' knowledge, skill, and alertness in a wide variety of driving situations, both city and rural. During this movie, as well as during the introductory movie, errors were signaled on the panel in front of the driver and accumulated on the automatic counters on the control board.

As soon as the driving test was finished, the basic skin conductance electrodes were fastened to the left hand of each subject. Subjects were again requested to sit as quietly as possible and to refrain from talking to each other or from any muscular activity that they could avoid. The driving test scores were read and recorded and the automatic counters reset to zero. Approximately three minutes after the last subject's electrodes were attached to him, reading of the individual base skin conductances began, starting with the subject whose electrodes were attached first. Upon completion of this reading for all subjects, the treatment film was begun. Near the midpoint of the film, another skin conductance reading was taken for each subject. When the film was over, the subjects were again asked to sit quietly until given the signal that they were free to move. During this time, the trailer lights were left dimmed and the treatment film was rewound and the driving-test film again threaded into the projector. This provided a rest period of from three to four minutes after the end of the test film until the beginning of the reading of the base skin conductance for the third time. Upon completion of the reading for all subjects, the lights were again turned on and the electrodes removed from the subjects' hands. They were then given a five minute break, during which time they were allowed to talk, smoke, get up and move around, etc. At the end of the break period, either the Siebrecht Attitude Scale was again administered to them (this was the short paper and pencil test they were promised) and, after this was finished, the driving test was again given; or these two things were done in the reverse order, the order being randomly changed from session to session. At the end of the second driving test, the error scores were read and recorded. This being the end of the experimental session, the subjects were returned to the university campus, or released to go their own ways. They were asked not to talk about the experiment to their friends.

RESULTS

The results of the experiment will be reported in four parts: (a) the base skin conductance test of the different fear-arousing intensity levels of the communications, (b) the effects of the fear-arousing communications on the attitudes, (c) the effects of these communications on the driving behavior, and (d) the relation of the attitude change to the behavior change.

Verification of Differential Levels of Fear-Arousal Intensity in the Treatment Communications

The statistics of the base skin conductance measurements are reported in Tables 1 and 2. Differences between means for Trial 1 and Trial 2 were calculated for each treatment level. The several differences were compared by use of the t test. Significant differences were found between the Control group (E_o) and both the Moderate (E_2) and Strong (E_3) Intensity movies: between the Minimal intensity movie (E_1) and both the Moderate and Strong Levels; and between the Moderate and the Strong intensity levels. These results can be accepted as evidence that the three treatment movies - the three levels of fear-arousing communication - produced three distinct levels of emotional arousal. The Control and Minimal level movies produced virtually no increase in base skin conductance; the Moderate level produced a marked increase in arousal; and the Strong movie produced a level of arousal significantly higher than the Moderate movie.

TABLE 1

Changes in Base Skin Conductance Levels

	MEN							
	Control		Minimal		Moderate		Strong	
	Before	After	Before	After	Before	After	Before	After
$\overline{X}$	39.29	33.43	39.43	37.71	33.29	39.07	36.57	52.00
SD	16.67	16.54	20.43	19.04	24.01	30.34	22.58	24.42
$D_{\overline{x}}$	- 5.68		1.72		5.78		15.43	

Groups	t	P
Control vs. Minimal	4.23	$< .01$
Control vs. Moderate	5.67	$< .01$
Control vs. Strong	10.78	$< .01$
Minimal vs. Moderate	2.59	$< .05$
Minimal vs. Strong	9.20	$< .01$
Moderate vs. Strong	5.39	$< .01$

TABLE 2

Changes in Base Skin Conductance Levels

WOMEN

	Control		Minimal		Moderate		Strong	
	Before	After	Before	After	Before	After	Before	After
$\overline{X}$	36.07	33.50	44.07	44.29	39.64	45.43	50.14	62.57
SD	22.34	21.31	28.08	30.45	26.06	29.73	26.74	21.66
$D_{\overline{x}}$	- 2.57		0.22		5.79		12.43	

Groups	t	P
Control vs. Minimal	1.54	$> .10$
Control vs. Moderate	3.94	$< .01$
Control vs. Strong	7.11	$< .01$
Minimal vs. Moderate	4.89	$< .01$
Minimal vs. Strong	6.71	$< .01$
Moderate vs. Strong	4.05	$< .01$

Attitude Change

The changes in attitude were measured with the Siebrecht Attitude Scale. All subjects were given the scale 4 to 6 weeks prior to, and then again at the end of the experimental session, as described in the method chapter. The mean changes in attitude for each treatment combination are presented in Tables 3 and 4. It will be readily noticed that the statistics are somewhat different from what might have been expected. The only noticeable differences between means are in the control treatment level, (Table 3) and in the Heteronomy group exposed to the strong fear-arousing communication, (Table 4) which latter is directly counter to the prediction. Analyses of variance of these results (Tables 5 and 6) reveal no differences with a significance as large as .05 with the exception of the Trials effect.(Table 6) The Trials effect in the men's results approaches significance at the .05 level, (which could be taken as evidence of some effect, but not a strong one). Since there are no other significant main effects nor interactions, there is little that can be said to explain these results.

Figure 1 offers a graphic representation of the relationships between the changes in the several personality groups across treatment levels. Again keeping in mind the fact that there are no significant differences attributable either to the personality category or to the communication effect, it is of some interest to note the differences between the curves for men and those for women. No personality group produced similar curves for men and women. It might be pointed out that the curve for the women's Heteronomy group, taken as a trend only, represents an almost exact contradiction of the prediction.

TABLE 3

Means and Standard Deviations of Attitude Scores by Z-Scale Categories and by Fear-Arousal Levels

MEN										
		Fear-Arousal Levels								
Z-Scale Categories		Control		Minimal		Moderate		Strong		Total Mean Change
		T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	
Autonomy	$\overline{X}$	154.37	165.25	156.38	158.38	152.63	153.50	160.13	164.13	4.44
	SD	12.60	14.25	15.00	18.00	18.32	12.32	7.43	11.32	
	$D_{\overline{x}}$	10.88		2.00		0.87		4.00		
Average	$\overline{X}$	156.63	154.37	161.38	160.25	159.75	157.75	155.88	160.00	-1.27
	SD	4.95	11.41	11.00	16.65	13.24	12.76	12.12	14.93	
	$D_{\overline{x}}$	-2.26		-1.13		-2.00		4.12		
Heteronomy	$\overline{X}$	159.25	165.88	164.88	166.25	161.63	165.88	158.88	155.13	8.50
	SD	9.58	16.85	11.48	11.52	9.80	10.46	13.69	6.98	
	$D_{\overline{x}}$	6.63		1.37		4.25		-3.75		
Total Mean Change		5.08		0.75		1.04		4.37		

TABLE 4

Means and Standard Deviations of Attitude Scale Scores by Z-Scale Categories and by Fear-Arousal Levels

		WOMEN								
		Fear-Arousal Levels								
Z-Scale Categories		Control		Minimal		Moderate		Strong		Total Mean Change
		T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	
Autonomy	$\bar{X}$	162.72	165.86	161.71	164.86	156.00	162.57	160.14	165.14	4.47
	SD	12.04	13.67	12.92	11.75	12.08	11.87	8.77	15.94	
	$D_{\bar{X}}$	3.15		3.15		6.57		5.00		
Average	$\bar{X}$	159.00	161.14	165.57	168.57	160.71	163.43	165.57	166.57	2.21
	SD	15.84	16.64	11.05	12.33	12.88	12.49	12.77	12.81	
	$D_{\bar{X}}$	2.14		3.00		2.72		1.00		
Heteronomy	$\bar{X}$	159.71	157.43	165.71	163.71	160.29	164.86	163.86	174.29	3.16
	SD	10.39	14.49	16.79	18.44	12.77	12.00	15.00	12.65	
	$D_{\bar{X}}$	- 2.28		- 2.00		4.57		10.43		
Total Mean Change		1.00		1.38		4.62		5.48		

TABLE 5

Analysis of Variance of Attitude Scale Scores - MEN

Source	df	MS	F
Between Subjects	(95)		
Heteronomy (Z)	2	350.00	1.36
Communications (C)	3	68.67	
Z x C	6	233.33	
Error (b)	84	256.89	
Within Subjects	(96)		
Trials (T)	1	208.00	3.11
T x Z	2	90.50	1.35
T x C	3	49.33	
T x Z x C	6	73.33	1.10
Error (w)	84	66.86	

TABLE 6

Analysis of Variance of Attitude Scale Scores - WOMEN

Source	df	MS	F
Between Subjects	(83)		
Heteronomy (Z)	2	37.00	
Communications (C)	3	269.33	
Z x C	6	108.67	
Error (b)	72	313.32	
Within Subjects	(84)		
Trials (T)	1	409.00	8.05 **
T x Z	2	19.50	
T x C	3	53.67	1.06
T x Z x C	6	43.67	
Error (w)	72	50.83	

** P .01

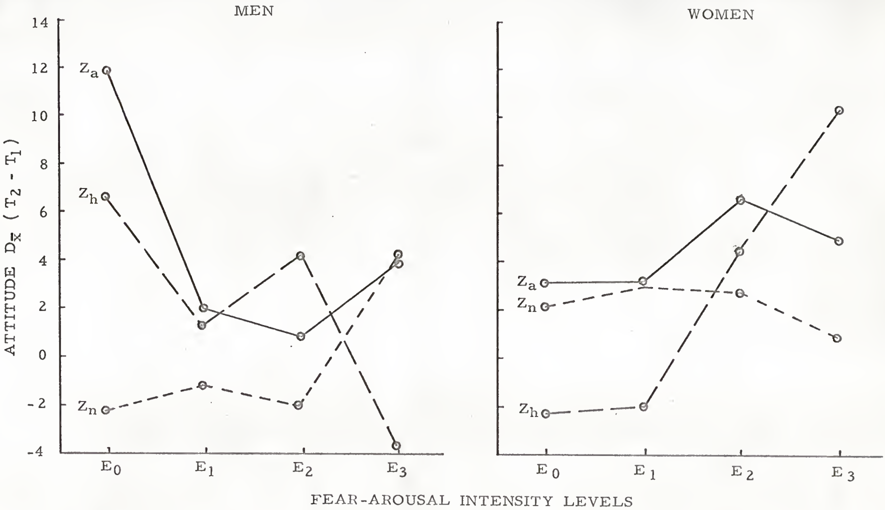

Figure 1. - - Differences between means of attitude scale scores for Z-Scale groups Autonomous (Z_a), Average (Z_n), and Heteronomous (Z_h) at fear-arousal levels Control (E_0), Minimal (E_1), Moderate (E_2), and Strong (E_3).

Driving Behavior Change

The change in driving behavior was measured in terms of the difference in numbers of errors made in the two driving simulation tests. The score originally used was the sum of the numbers of errors made in braking, steering, use of turn signals, and speed. However, it was discovered that many of the subjects were either forgetting to use the accelerator pedal, intentionally avoiding using it, or making some other mistake that contributed to reduction in the number of speed errors. As it was not possible to observe all of the subjects for an adequate control of this factor, the speed errors were not included in the sum used as the driving test score. Tables 7 and 8 present the means, standard deviations, and differences between the means by trials for the several treatment combinations. Tables 9 and 10 present analyses of the variance among them. The responses of the men are so different from those of the women that the two groups will be discussed separately.

As in the results of the attitude change measures, the only significant factor in the women's group is the Trials effect, which again is a strong one. However, there is practically no indication whatever that any other main factor is operating. Therefore it can only be assumed that the differences are due to a practice effect or to some other unknown variable.

The responses of the men on the driving test are markedly different. Here also the Trials effect is a strong one; but the Communications effect barely missed being significant at the .05 level. Inspection of Table 7 and Figure 2 will reveal that, although it cannot be accepted as significantly different, the amount of change is least at the strong intensity level., thus giving some support to the general

TABLE 7

Means and Standard Deviations of Driving Test Scores by Z-Scale Categories and by Fear-Arousal Levels

MEN

Z-Scale Categories		Fear-Arousal Levels								Total Mean Change
		Control		Minimal		Moderate		Strong		
		T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_3	
Autonomy	$\overline{X}$	70.25	47.13	61.63	40.88	76.63	56.87	54.00	40.87	19.12
	SD	14.24	10.20	12.73	8.06	13.70	15.59	9.67	6.86	
	$D_{\overline{x}}$	23.12		20.75		19.76		13.13		
Average	$\overline{X}$	64.63	47.63	63.63	48.75	74.25	47.00	73.13	51.38	20.10
	SD	5.24	10.77	12.35	15.46	9.90	9.59	18.29	15.56	
	$D_{\overline{x}}$	17.00		14.88		27.25		21.75		
Heteronomy	$\overline{X}$	70.25	54.12	58.63	42.00	61.50	44.75	60.38	49.00	15.22
	SD	16.61	12.60	7.69	7.61	9.91	10.71	11.24	13.99	
	$D_{\overline{x}}$	16.13		16.63		16.75		11.38		
Total Mean Change		18.75		17.42		21.25		15.42		

TABLE 8

Means and Standard Deviations of Driving Test Scores by Z-Scale Categories and by Fear-Arousal Levels

WOMEN

Z-Scale Categories		Fear-Arousal Levels								Total Mean Change
		Control		Minimal		Moderate		Strong		
		T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2	
Autonomy	$\overline{X}$	69.43	52.86	69.71	51.71	64.14	52.43	66.43	51.43	15.82
	SD	10.00	14.73	12.20	14.45	11.95	9.30	10.00	11.74	
	$D_{\overline{x}}$	16.57		18.00		13.71		15.00		
Average	$\overline{X}$	68.14	48.86	67.43	54.43	73.14	54.86	71.57	48.14	18.50
	SD	18.19	9.82	5.10	16.00	12.98	13.38	19.82	13.77	
	$D_{\overline{x}}$	19.28		13.00		18.28		23.43		
Heteronomy	$\overline{X}$	61.14	44.57	69.00	49.14	74.57	50.31	61.86	48.14	18.60
	SD	12.77	11.10	13.24	6.98	11.33	9.78	15.19	14.07	
	$D_{\overline{x}}$	16.57		19.86		24.26		13.72		
Total Mean Change		17.37		16.94		18.75		14.05		

TABLE 9

Analysis of Variance of Driving Test Scores - MEN

Source	df	MS	F
Between Subjects	(95)		
Heteronomy (Z)	2	221.50	
Communications (C)	3	616.00	2.56
Z x C	6	550.33	2.29 *
Error (b)	84	240.75	
Within Subjects	(96)		
Trials (T)	1	15,768.00	789.98 **
T x Z	2	104.50	5.24 **
T x C	3	80.00	4.01 **
T x Z x C	6	68.67	3.44 **
Error (w)	84	19.96	

* $P < .05$
** $P < .01$

TABLE 10

Analysis of Variance of Driving Test Scores - WOMEN

Source	df	MS	F
Between Subjects	(83)		
Heteronomy (Z)	2	186.00	
Communications (C)	3	178.33	
Z x C	6	84.33	
Error (b)	72	265.38	
Within Subjects	(84)		
Trials (T)	1	13,073.00	302.33**
T x Z	2	35.00	
T x C	3	6.67	
T x Z x C	6	71.17	1.65
Error (w)	72	43.24	

** $p < .01$

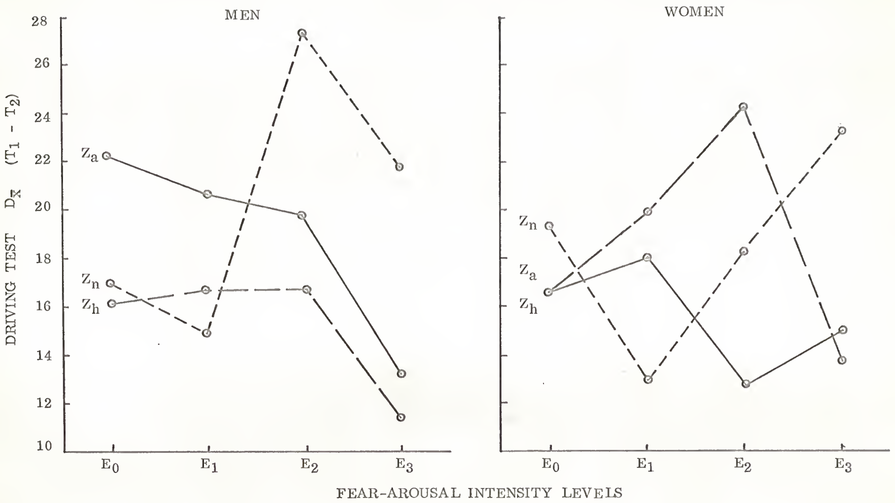

Figure 2. -- Differences between means of driving test scores for Z - Scale groups Autonomous (Z_a), Average (Z_n), and Heteronomous (Z_h) at fear - arousal levels Control (E_0), Minimal (E_1), Moderate (E_2), and Strong (E_3).

prediction. The interaction between the Communication effect is more influential at certain levels of the Z-Scale effect than it is at others. Inspection of Table 7 and Figure 3 reveals that, for those subjects making scores toward the extremes of the Z Scale, change in number of driving errors is inversely related to the intensity of the fear-arousing communication. Insofar as the results of the Communications effect are acceptable as significant, this supports the prediction that there would be an inverse relation between amount of change and intensity of fear-arousing stimulus. However, it does not support the prediction that subjects with higher Z-Scale scores would change less than those with lower Z-Scale scores. According to the prediction, the low-scoring, or Autonomous group, would have shown the least change across fear-intensity levels. As it turned out, the mean amount of change in the Autonomous and Average groups is almost identical. The lesser amount of mean change manifested by the Heteronomous group might be taken as a trend in the direction of the prediction that the Heteronomous group would show the least change.

A further refutation of the prediction concerning the relationship between change in behavior and levels of Heteronomy and fear-arousing intensity is provided by the average group whose responses, in general, result in greater change with increasing intensity of fear arousal. The overall results therefore give insufficient support to the predictions for the main effects for them to be accepted, with the exception of Trials, of course, which probably can be attributed largely to practice. However, there is a definite and strong interaction between each pair of the three variables and between all three variables in the men's experiment, and these are assumed to have produced the results presented in Table 7 and

Figure 2. These results reveal that as the level of fear-arousing intensity in the communication is increased, subjects with higher scores on the Z Scale will tend to make less change in their driving behavior.

The one prediction concerning driving behavior which seems to have been supported beyond any doubt is the one stating that the results of the effects on men would be different from the results of the effects on women. Inspection of Table 8 and Figure 2 (women) and comparison with Table 7 and Figure 2 (men), will reveal that not only were there no appreciable differences between treatment combinations among the women; but that what changes there were, were not found in relationships similar to those of the men.

Relationship Between Changes in Attitude and in Driving Behavior

Inspection of Tables 3 and 7 reveal that there is apparently no systematic relationship between the men's changes of attitude and their changes of behavior. Inspection of the women's results, Tables 4 and 8 also reveals no meaningful relationships. Neither the communication nor the predisposition to respond to it seem to have had any significant effect on either attitude or behavior. There is a very slight trend in the attitude results which suggests that as the fear intensity was increased, the amount of change increased, which would have been counter to the prediction. There is another hint of a trend in the driving test results that might be taken as a suggestion that the Heteronomous group experienced the least change, that is, improvement - in driving behavior, which would be in support of the prediction. Considering the personality groups without consideration of the fear- intensity levels reveals differences so small that it does not seem safe to even suggest that a trend exists there.

In order to substantiate the appearance of no relationship between changes of attitude and changes of driving behavior, a correlation between the difference scores for the two measures was computed. Using the Pearson product-moment coefficient, a correlation of .133 was obtained for the men, and a correlation of -.028 was obtained for the women. This can be accepted as evidence that there probably is no relationship between the attitude change and the behavior change in this experiment (For $P = .05$, the coefficient of correlation would have had to be approximately .200 and .211, respectively.)

DISCUSSION

The results of the experiment failed to support the hypotheses concerning attitude change. The men's results concerning behavior change were in the predicted direction, but they did not reach an acceptable level of significance. The men's results of the driving test were patently different from those for women; but the men's results of the attitude change experiment are not demonstrably different from those of the women.

The patterns of the men's and women's attitude scores present quite different pictures, although the analyses of variance do not support the appearances. Thus, because the separate results for the men and the women both failed to reveal significant differences (except across trials), there is little that can be said about them that is not speculative. The men's attitude change tends to be related to the personality variable, Heteronomy, but not to the communication variable, fear-arousing intensity. The women's results, on the other hand, suggest the possibility of a communications effect. However, since none of the principal variables produced results that were statistically significant, there are no strong grounds on which to make interpretations. There are a number of possibilities that might throw some light on the failure of the results to support the predictions. Each of the four predictions will be considered in the light of these possibilities.

(1) As threat intensity increases, the amount of measured change in attitude will decrease

The findings from several studies might offer some explanations of the failure of this prediction. Zimbardo (1960) found that subjects with high involvement in the attitude object tended to change more than subjects with low involvement. In the present study, if high scores on the attitude scale pretest are indicative of high involvement with driving safety, it might be assumed that a correlation would be found between high original positions of the attitude scale and large change in attitude - at least in a negative direction - as a result of the communication. A test of this assumption was made using the Pearson product-moment correlation coefficient. No significant correlation was found in any treatment combination. In a study investigating the effect of the relative distance between the subject's attitude position and the position recommended by the communication, Hovland, Harvey, and Sherif (1957) found what seems to be a contradiction to Zimbardo's results (Perhaps it would be more appropriate to reverse the implied sequence of these events). They found that subjects who originally occupied extreme positions on an attitude tended to change less than did those whose positions were not so extreme. No such relationship could be found in the present results.

Another aspect of involvement with the attitude's object is the possibility that many of the subjects were not actively involved in automobile driving as a frequent behavior at the time of the experiment. One of the items of information asked for in the first session was the number of years the subject had driven a car with a driver's license. The average number of years was five and the average age of the subject, nineteen. Several subjects were interviewed subsequent to the end of the experiment and it was learned by the experimenter that whereas most of the subjects had had a valid driver's license for approximately five years, apparently a considerable number of them had actually driven an automobile only on infrequent occasions during those years. Most of the subjects were either freshmen or sophomores; and at the University of Florida members of these classes are not allowed to operate an automobile in the county. This would mean that the majority of the subjects had operated an automobile very little during the four to sixteen months prior to the experiment. The influence of this factor can be determined only with further research.

Walster and Festinger (1962), Ewing (1942), and Allyn and Festinger (1961) have demonstrated in several ways that the factor of prior knowledge of the content of the communication is influential on the persuasiveness of the communication. The effect of this factor has been explained by suggesting that the recipient of the communication -- when forewarned -- is able to prepare himself to withstand the persuasion of the communicator. Their general findings are that when the subject is warned, he is less likely to change his attitude position that when he is not warned of the intent of the persuasive communication. In the present study, one of the standard, routine requests made at the end of each experimental session was that the subjects not discuss the experiment with any other of their friends for the reason that it might bias the performance of those who also happen to be subjects. However, it became known to the experimenter at two or three experimental sessions that some of the subjects had already heard something of the procedure. Another possibly confounding factor was inadvertedly entered into the introductory talk given to each experimental group just prior to the beginning of the experimental session. In the course of telling the subjects what they would be expected to do, they were told that they would see a movie about driving safety (or a movie about volcanos, whichever was appropriate for the group). None of the subjects admitted to having seen any of the treatment movies prior to the experimental session in which they were shown them. However, movies similar to the ones used as the moderate and strong appeals had either been seen, or had been heard of in some detail, by most of the subjects. The factor of foreknowledge probably was not of great significance in the outcome of this experiment. However, an additional possibility that may merit some consideration is that the driving simulation in which the subjects participated just prior to their exposure to the persuasive communication may have helped to bolster their resistance to change by tending to "immunize" them against change. This may have been mediated both by the instruction in the movies and by subjects' role-playing with guidance, as suggested in the report of McGuire and Papageorgis (1961).

The factor of cognitive appraisal of the communication was not manipulated in this experiment. Lazarus, Speisman, Mordkoff, and Davison (1962) demonstrated that the "set" given by the content of the narration accompanying a fear-arousing movie has a differential effect on attitude change, depending on the "value" it gives the cognitive appraisal. Whatever set was established in each of the four movies in this experiment was established by the accompanying narrative. The experimenter added no comments of his own. Therefore, although the narration was the same for each showing of a particular movie, no attempt was made to control the effect of the factor of differential cognitive appraisal of the movie in terns of threat. The experimenter's subjective judgment of the narrative in each of the films considered them to be in keeping with the general level of emotion-arousing content in the film.

In the present experiment--for practical reasons--no effort was made to hold constant the content of the communications (i.e., the movies). The assumption was made, and accepted by the experimenter, that the three treatment movies were concerned with the same general theme of driving safety and driving effectiveness. The movies were otherwise selected on the basis of their producing a differential emotion-arousing effect. Also it was considered not feasible to attempt to control the content of the attitude scale so that it conformed in detail with the content of the movies. It is suggested that a low degree of correspondence between the cognitive contents of the movies and of the attitude scale may have weakened the relationship between the communication and the amount and direction of the attitude change. It is further suggested that while the communication produced emotional arousal, it resulted in non-specific responding.

The factor of distraction and selective attention resulting from the emotional arousal might have played a part in the responses of the subjects. Janis and Milholland (1954) showed that subjects who were exposed to a high-threat persuasive communication tended to remember items in the communication related to consequences of the threat, rather than the items which were offered as causes of the threat. It is suggested that in the present experiment some subjects might have failed to change their attitudes because they remembered those items in the strong fear-arousing movies concerning consequences of failure to adopt the recommendations. This suggestion is offered because there were no items in the attitude scale concerned with violence, death, and destruction; whereas, the principal content of the strong fear-arousing appeal was made up of these items. If subjects remembered in the selective fashion shown in the Janis and Milholland experiment, then it is reasonable to hypothesize that there was little or no carryover of cognitive content from the communication to the attitude scale for some of the subjects in the strong fear-arousing treatment combinations. In effect, the cognitive aspects of their attitude--as measured by the scale--had not been influenced by the communication.

Another factor that might lend itself to the explanation is the one of order of presentation of the cognitive and emotional contents of the communication. In The Order of Presentation in Persuasion (Hovland et al., 1957), a study of Janis' is reported in which he found that presenting the cognitive content of a persuasive communication before presenting the emotional content produced more change in attitude than the reverse order of presentation. In his study the communication was concerned with the effect of a new type of grading system on the probability of students making higher or lower grades than they had made under an old grading system. There is some question whether the message is analogous to that of the communications in the present study. However, on the chance that Janis' findings are applicable to the present study, it should be pointed out that both the moderate and the strong fear-arousing movies began with a scene obviously intended to catch the attention by arousing the emotion of the viewer. The moderate-stimulus movie begins with an ambulance racing through a town and down a country road, its siren screaming until it arrives at the scene of an automobile accident in which several people have been badly injured. The strong-stimulus movie begins with the close-up scene of a woman trapped in a wrecked automobile in obviously extreme agony. The narration at the beginning of both movies is in keeping with the scenes presented. It could be conjectured that because emotion was aroused before the message was presented, the subject reacted to the content of the emotion-laden scenes and did not relate them--at least at the time--to the subsequent message.

✓

The last factor to be suggested as a possible contributor is the ambiguity of the life situation in which the average subject finds himself. It is a reasonable speculation that many times prior to their participating in this experiment that an appreciable number of the subjects had considered the possibilities and probabilities of their being involved in a serious automobile accident. Several incidents in the moderate- and strong-stimulus movies present the serious, law-abiding, innocent driver as the chance victim of another driver. Certainly most of the subjects are acquainted, either directly or indirectly, with this kind of accident. Unless the subject is offered some convincing recommendations as to how he might avoid becoming an innocent victim of someone else's negligence, it is reasonable to assume that he will find himself in a quandary, and uncertain which attitudes or behavior to adopt in order to avoid the type of consequences presented in the fear-arousing communication. If it may be assumed that the ambiguity of the communication in the driving safety movies is an example of the general ambiguity found in life by many of today's young people, it could be hypothesized that more or less specific attitudes about many social objects are ill-formed and weak. Instead, these individuals can be seen as being hopelessly at a loss insofar as having any sort of preparatory sets to respond to specific situations. Rather, they can be expected to react to each individual life situation as the immediately perceived costs and rewards appear to them. It is recognized that this would seem to violate the principle enunciated by Asch (1948) which holds that as the stimuli become more ambiguous, modification of attitudes and opinions becomes less difficult. It may be that the principle has not been violated; but that each individual is performing according to the principle of Asch and at the same time, according to the one expressed above. This possibility was suggested by the fact that, although the average change in almost all treatment combinations did not prove to be of statistical significance, individual changes -- both positive and negative -- were large and fairly frequent. Under these circumstances it is suggested that the subjects would respond to items on an attitude scale in a more or less random manner, probably more influenced by immediate stimulus complexes than by an enduring organization of attitudinal processes.

No conclusions can be reached with the present data as to the degree of influence of the several possible mediating factors mentioned above. It is suggested that the greater possibility is that a number of factors are in operation in any one treatment combination or on any one subject. It is further suggested that, in the present study, these factors may have acted to cancel out each other, thereby producing the unexpected results.

In reference to the statement that the present data preclude the reaching of conclusions, it probably should be pointed out that the methods of treating the data in this experiment were quite different from those generally used in the Janis and Feshbach type experiments. Janis and Feshbach used two separate, five-item measures of attitude change, both which were handled in the following manner: "Each student was given a score, ranging from 0 to 5, which represented the number of recommended items on which he conformed . . . . By comparing the score that each individual attained one week after the communication with that attained two weeks earlier, it was possible to determine for each treatment group the percentage who changed in the direction of increased or decreased conformity" (1953, p. 84). The reliability of the differences was tested by use of a critical ratio formula described by Hovland, Lumsdaine, and Sheffield (1949, p. 319). In the present study, a 40-item scale was used; and the difference between treatment and post-treatment levels was tested by analysis of variance. The justification for using statistical methods different from those of Janis and Feshbach is based, partly at least, on the desire to use measuring instruments which were both readily available to the experimenter and which were in common use by driving and safety education programs. Although it was not intended as a primary concern of this experiment, the efficacy of the scales and driving simulator in terms of future usefulness in this kind of study is a secondary factor worthy of observing.

(2) As threat intensity increases, the behavior will become increasingly ineffective

According to Fine (1964), Sarnoff and Katz (1954), and Barmack and Payne (1961), one should not expect any predictable relationship between attitude change and driving-behavior change. The possibility is written off as being an over-simplification of a very complex set of dynamics, probably unique for every driver. Table 10 presents evidence that seems to support this expectation. The only significant effect in the women's results is that of Trials; and it is easy to attribute this to practice. However, Suhr and Lauer (1961) reported a study which gave strong evidence against there being any practice effect in the operation of the driving simulator before the fifth or sixth trial. If their results are valid, where did the present ones come from?

For whatever the meagre effects of the men's results are worth in attitude change, there is no apparent relation between these results and those for behavior change. If it can be tentatively entertained that attitudes really do mediate behavior, the men's attitude change and behavior change data seem to affront each other. However, if we examine the data of Table 7, we will find that the results do tend to support the prediction if we remember the U-shaped function of subjects when grouped on a personality variable, and either a bi-polar measure is used, or only the extreme scores are considered. Now it will be seen that for the Autonomous and Heteronomous men's groups, as we move up the scale of fear-arousing intensity, the average amount of driving-behavior change decreases. It is unfortunate that none of these changes can be accepted as statistically significant (Figure 3, Men).

The results of the communication effect on driving behavior are more than mildly puzzling, since this effect produced no noticeable results on the attitude. Again, if we assume that behavior is mediated by attitudes, then by what system of dynamics does a communication effect influence a behavior without, apparently, having had any influence on the mediating attitude? Probably it would be worthwhile to continue the assumption that attitudes mediate behavior, and to suggest that attitudes related to the driving behavior were actually influenced, but not measured, by the attitude scale used in this experiment. Given the complexity of attitudes and attitude clusters, and again noting the fact that there was no attempt made to develop attitude and behavior measures whose content was closely related, it is probably safe to accept the above suggestion as the most likely explanation of the confusing results.

(3) Under high threat conditions, subjects with a predisposition to reject threatening appeals will change their attitudes less than subjects without such predisposition

The expectations behind the above prediction were based on the Janis and Feshbach (1953) report of their attitude-change study using fear-arousal as an independent variable in the persuasive communication. On reading this report, the speculation was formed by the present experimenter that the results were partly due to individual differences in responding to threat, and that these differences might be expressed in terms of a personality variable. Further reading disclosed that Janis and Feshbach (1954) had had the same idea, and had explored it. They observed the relationship between the amount of attitude change (as measured) and the level of anxiety of the subjects (as measured). The present experiment followed the same general design, except that three levels of a personality variable were used instead of grouping subjects according to a bi-polar anxiety measure.

The report of a study by Linton and Graham (1959) served as the basis for choosing the authoritarian variable as a personality correlate. Their report indicates that individuals characterized by some authoritarian traits -- under non-stress conditions -- have a relatively greater acceptance of persuasive communications. The relation of the Pensacola Z Scale to both authoritarian traits and anxiety seemed to recommend it for use as a predictor of how people would respond to a persuasive communication under varied levels of stress (or fear appeal). The findings of Linton and Graham were expected to be reversed as the subjects were exposed to a rising level of fear-arousal intensity.

Interpretation of the present results might be attempted in two general directions. If it is maintained that the predicted relationship should have been substantiated, then the first explanation offered suggests that the experimental subject sample was actually not representative of the population in some important feature(s). It is rather difficult to accept this suggestion, although the possibility of its validity is not denied. Perhaps easier to accept is the explanation that the Pensacola Z Scale is not adequate as a discriminator on the personality variables which others have found to be significantly related to attitude change. Insofar as its being a measure of anxiety level, it must be remembered that its author claims anxiety as only one of four traits measured as a cluster; and since his effort to develop extended scales to measure each trait ended in failure, we have no way of knowing how much each trait contributes to the characterization of the individual as Heteronomous (Jones, 1957).

It is interesting to note that the contribution of the Z-Scale effect -- although not acceptable as significant -- was noticeable in the men's results both as a main effect and in both its interactions (Table 5). No such suggestion is evident in the women's results (Table 6). This tends to support the finding of Janis and Field (1959), that personality correlates of persuasibility are more demonstrable in men than in women; which has been interpreted to mean that the "American" culture demands of women greater compliance with prestigeful sources of communication, regardless of her predispositions. Their other finding, that women are more persuasible than men, is not supported by this study.

In further reference to the men's results (Table 3), there is an indication that attitude change is greater among those subjects who score either high or low on the personality correlate, than it is among those with average scores (Harvey, Hunt, and Schroder, 1961).

There is no readily available, satisfactory explanation for the strength of the trials effect on attitude change in the absence of significant main effects. The only surmise that is tenable is that something unknown to the experimenter happened to the subjects in the four to six weeks between trials. The possibility was once entertained that the act of driving in the simulator might have served to produce a "role-playing effect," which " ...tends to augment the effectiveness of a persuasive communication " (Janis and King, 1954, p. 216). However, the generalization from Janis and King's experiment to this one is difficult, since their role-playing involved verbal behavior, in which the subject may have served as his own persuader, while the simulator driving was non-verbal behavior. Even if the generalization is accepted, there still remains the question of the failure of the communication effect to reach significant levels.

There is little to be said about the lack of a significant interaction between the Z-Scale and communication effects, since neither of these effects reached significance alone.

(4) Under high threat conditions, subjects with a predisposition to reject threatening appeals will increase in ineffectiveness of behavior

In reference to this prediction, there is again little to say for the women's results (Tables 8 and 10) except to ask what produced the Trials results.

In view of the Z Scale's modest, but sole contribution to the men's attitude change results, it is mildly puzzling that this effect apparently made no contribution to the men's driving behavior results, while the communications effect did. Under the circumstances, it is not logical to attribute to the Z-Scale effect more than a token amount of the results of the Trials X Z-Scale interaction. The failure of this personality characteristic effect to produce significant results is in contradiction to many studies and cogent speculations. ~~Frances~~ Flanders Dunbar (1959) has written very persuasively for the existence of an accident-prone syndrome. Fine (1964), Benton, et al. (1961), and Beamish and Malfetti (1962) have reported studies which gave support to the idea that level of anxiety and several authoritarian factors are highly related to effectiveness of driving behavior.

In view of the incongruity of the men's behavior results with all the other results, it would be easy to suggest that they may represent an accidental concatenation of circumstances; and that in accepting them, a Type 1 error has been made.

Comparison of the men's and women's results

The only apparent commonality between the responses of the men and the women to the treatments is manifest in the Trials effect. However, it has not been possible to attribute any definite cause to these effects, so that it is not sound to say that they actually show commonality. It might very well be that they came to similar results for quite different reasons. In reference to the change of attitude, Tables 5 and 6 show that the men's results reflect some influence of the personality variable and its interaction with Trials, while the women's results reveal a minor interaction effect between communication and Trials. Considered across treatment levels or across Z-Scale levels (Tables 3 and 4), the changes among treatment combinations do not follow similar patterns. Insofar as the changes in behavior are concerned, the differences are even more outstanding. With the exception of Trials, the women's results show practically no changes; while there is a significant result produced in the men's table by all of the interactions, a nearly significant one by the communications effect, and no apparent result attributable to the Z-Scale effect. Again, a difference can be demonstrated in Tables 7 and 8. The men's results produce the U-shaped curve found in personality-correlate studies when the performance of the subjects with extreme personality scores are considered separately from those with average scores. The women's results reveal no systematic pattern of change among treatment combinations, neither across treatment levels nor across Z-Scale levels.

Considerations for future research

There are two aspects of the problems of this experiment that particularly concern and intrigue the experimenter. The first is the possibility that the present "state of the art" is not adequate for manipulation of attitudes and supposedly related behavior with any satisfactory degree of reliability. It may be that development of a more comprehensive and sophisticated theory of attitudes is a requisite for effective understanding of attitudes and behavior. A challenging direction for investigation has been suggested by DeFleur and Westie (1958), who offer the possibility that the predicting of behavior might be enhanced if we learn to analyse and measure the beliefs of an individual about the norms, attitudes and values held by his reference groups, significant others, peer groups, voluntary organizations to which he belongs, etc. They also recommend the development of standardized "overt action opportunities" by which to measure attitudes and attitude change. This latter is seen by this investigator as most intriguing, but presenting considerable problems of design and conceptualization.

The second aspect of major concern in the present experiment, and of interest for future studies, is that of instrumentation. It must be admitted that all of the instruments used in the present experiment--both mechanical and verbal--left much to be desired. Special mention of the driving simulator seems in order. This machinery was designed to be used as an adjunct to public school programs in driver education. That it was not really suitable for experimental research is attested to by the fact that it is relatively inflexible and limited in the range and variety of behaviors that can be observed in it. Even more dissatisfying is the fact that the subject is left little freedom to respond as he would in a real-life situation; and that he cannot actually control his "car" in the simulated driving situation. This is thought to reduce the subject's reinforcement of his choices and behaviors and to preclude optimum evaluation of them as dependent variables.

During the course of the experiment, the experimenter learned that simulators have been built which can be programmed to reproduce all sorts of driving situations; and the subject can manipulate either a small car (or the image of one) by means of regular automobile controls. The opportunity to program the driving situation, which could then be tailored to fit attitude and personality trait measures, seems to offer very good possibilities of conducting some meaningful investigations within the present limitations of our understanding of the problem. It is probable that the improvement in instrumentation may accelerate understanding in the field of attitude study as such improvement has in other fields. The remaining essentials for success would then be adequate money and capable investigators.

SUMMARY AND CONCLUSIONS

An experiment was undertaken to observe the changes in driving safety attitudes and behavior of subjects selected for three levels of Heteronomy and exposed to a graded series of fear-arousing communications. Safety attitude was measured with the Siebrecht Attitude Scale. The communications were presented in the form of three driving safety movies and an elementary science movie, which were shown to three experimental groups of subjects and to a control group, respectively. The safety movies were selected on the assumption that they all attempted to convey a similar safety message, but would elicit different amounts of emotional arousal in the viewers.

Ninety-six male and eighty-four female college students were employed as quasi-volunteer subjects. They were arranged in three personality classifications according to scores they made on the Pensacola Z Scale. Within these three classifications they were more or less randomly assigned to the control group, or to the Minimal, Moderate, or Strong intensity treatment group. Subjects within the twelve treatment combinations were fairly well equated on the bases of age, number of years of driving experience, score on the National Test in Driver Education, score on the Siebrecht Attitude Scale, and score on the Pensacola Z Scale. Tests for inter-correlations of the three scales produced no significant Pearson product-moment correlation coefficients.

All subjects were put through the same experimental procedure with the exception that the three treatment-level groups and the control group saw different movies, i.e., they were exposed to different degrees of fear-arousing persuasive communications. Subjects were introduced to a driving simulator, given an introductory and practice run in it, and then a driving test. Driving errors were automatically recorded for braking, steering, and the use of the turn signal. The total number of errors made was taken as the test score. After the driving test, subjects were presented with the persuasive communication in the form of one of the above-mentioned movies. Base skin conductance measures were made on all subjects just prior to, during, and just after seeing the treatment movie. This was done to ascertain that the movies produced significantly different levels of emotional arousal. After the treatment movie, the subjects were given the driving test in the simulator and the Siebrecht Attitude Scale, the order of their presentation being varied randomly from session to session.

It was predicted that attitude change and driving behavior change would be inversely related to the intensity of the fear-arousing appeal, and that subjects characterized by a high degree of Heteronomy would behave in conformity to this prediction more than would other subjects. It was also predicted that the men's responses would be different from the women's.

The men's and women's data were separately treated by analysis of variance. The difference scores for the attitude change and the behavior change were compared by use of the Pearson product-moment correlation coefficient.

Although some interesting (and puzzling) trends were noted, only one of the main effects, Communications, came close to producing significant results (i.e., exclusive of Trials, which result was attributed to practice). Several explanations were suggested in an effort to cast some light on the reason for the unexpected results. Of those offered, the following are thought to bear serious consideration as possible contributors to the failure of the predictions to be borne out: (1) the content of the persuasive communications, the attitude scale, and the driving simulator test were not sufficiently related; (2) the student-subjects were not sufficiently involved inthe problem of driving safety since their use of automobiles was quite limited; (3) the changes in attitude and behavior were mediated by a number of unknown variables so that the effect of any one was reduced below the point of statistical significance; (4) the experimental variables failed to offer an adequately structured situation so that the subjects were at a loss to decide which attitude or action to take in response to the situation; (5) statistical methods used were different from those used in other studies -- for secondary and practical reasons -- thereby allowing for the production of a mathematical artifact; (6) the instrument used to measure the personality variable was inadequately discriminating; (7) the contribution of one or a few personality correlates, or other mediating influences, is probably so small that meaningful prediction (or control) of attitude and behavior change is dependent on a comprehensive approach to the individual and to the "life space" he occupies.

APPENDIX

SIEBRECHT ATTITUDE SCALE
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PRELIMINARY EDUCATION

1. Name........................ City................. State............ Date.........................
2. Age........ Sex ....Extent of education: Freshman .... Sophomore......... Junior......... Senior .... Other.............
3. Place of residence: City................ Small town .... Country (farm) ....Other ....
4. Driving experience: (a) Number of years you have driven a motor vehicle .. .. (b) Approximate number of miles driven (1) last year............ (2) last five years .... (c) Number of accidents you have had (1) while driving ....(2) as a pedestrian ....
5. Kind of vehicle you drive most often: (a) Automobile..................... (b) Truck............. (c) Bus............ (d) Other..................
6. Method by which you learned to drive: (a) From member of the family .... (b) From a friend .... (c) By yourself.................. (d) Course in high school............ (e) Other.......................
7. Your occupation..................... Also your father's occupation if you are a student...............................

DIRECTIONS: Below is a series of statements about problems related to the driving of motor vehicles. There are no correct answers for these statements. They have therefore been set up in such a manner as to permit persons to indicate the extent to which they agree or disagree with the ideas expressed. Suppose the statement is Only persons who have reached their nineteenth birthday should be permitted to drive a motor vehicle.

....Strongly agree..X.Agree....Undecided....Disagree.....Strongly disagree

As you read the statement you will know whether you agree or disagree with the idea expressed. You must then indicate the extent to which you agree or disagree. If you agree fully, place an x before the words "Strongly agree"; if you agree but with reservation, that is you do not fully agree, place the x before the word "Agree," as in the sample above. If you disagree with the idea, indicate the extent to which you disagree by checking either "Disagree" or "Strongly disagree." But if you neither agree nor disagree, that is you are not certain, place the x before "Undecided." To indicate your attitude, read the statement carefully, then quickly check the position which best indicates your attitude. Do not spend much time with any statement. But be sure to answer every statement. You should complete the work in no more than ten minutes. Most persons will finish in less time. Work fast but carefully.

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in any form without permission in writing from the author.

STATEMENTS

1. Drivers' examination should be more difficult to eliminate all but the best drivers.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

2. The driver of an automobile should be the sole judge of the mechanical fitness of his car.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

3. Drivers who pass on hills and curves should be considered incompetent.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

4. Hit-and-run drivers should be classified as criminals.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

5. Drivers who have the right of way need not be concerned about sharing the road.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

6. A person should be permitted to drive a car only as long as he does not abuse his privilege.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

7. The drinking of alcohol by drivers should be a matter for the consideration of the drivers alone.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

8. Prospective drivers should take a course in the driving of the automobile.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

9. Strict enforcement of traffic regulations is the only way to prevent accidents.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

10. Pedestrians should at all times be solely responsible for their own safety.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

11. Every driver should be required to have his car inspected twice a year.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

12. Drivers who disregard traffic regulations should be punished only if they cause damage or injury.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

13. Most drivers lack the ability to control automobiles at high speed.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

14. Because "things just happen" one should not be concerned with the prevention of accidents.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

15. Drivers who handle cars carefully should not be denied the right to drive on public highways.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

16. Drivers convicted of hit-and-run accidents should have their licenses revoked.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

17. The driver of a car should decide when it is safe to pass on curves.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

18. A person should pass a physical examination before being issued a driver's license.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

19. A tired motorist should drive slowly until the drowsiness leaves him.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

20. The rudeness of traffic officers discourages courtesy on the part of the motorist.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

21. The sturdy construction of automobiles assures safety at any speed.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

22. Examinations for drivers' licenses should be required of all persons once a year.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

23. The present emphasis on the enforcement of traffic rules should be reduced.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

24. Every motorist should be required to pass a driving-skill test once in five years.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

25. Motorists should be permitted to run signals and lights when there is no cross traffic approaching.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

26. Inexperienced drivers should not be arrested for running through traffic lights.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

27. To accommodate the traffic, the cooperation of all drivers is necessary.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

28. The occurrence of accidents is a matter of chance and should be regarded as unavoidable.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

29. Until a person passes a driving-skill test he should not be granted a license to drive.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

30. A driver really is the best judge of the speed he should be permitted to drive.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

31. Drivers convicted of driving while under the influence of liquor should have their licenses revoked.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

32. People are as courteous "behind the wheel" as they are at any other time.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

33. Every driver should be required to pass an examination on the rules of the road.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

34. No person should be denied the right to drive an automobile.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

35. Examinations for drivers' licenses should be difficult enough to eliminate persons who are physically unfit and emotionally unstable.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

36. Pedestrians should yield the right of way to motorists.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

37. Drivers of automobiles should be more concerned with the welfare of their passengers than of themselves.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

38. Improved construction of automobiles makes driving skill less necessary today than five years ago.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

39. Driving is a cooperative affair in which the motorists share alike on the highways.
...Strongly agree...Agree...Undecided...Disagree...Strongly disagree

40. Drivers with many years of experience should not be required to submit to reexamination in later years.
...Strongly disagree...Disagree...Undecided...Agree...Strongly agree

THE PENSACOLA Z SCALE

In this test you will find pairs of statements having to do with personal characteristics. One member of the pair is labeled A and the other B. You are to select from each pair the statement that BEST describes you. Then indicate the statement you have chosen by making a heavy black mark between the lines under the letters A or B (but not C, D, or E) on your answer sheet. Consider the example shown below.

1. A) You are attractive.
   B) You are strong.

If you think You are strong describes you better than You are attractive, you would put a mark under B on your answer sheet. Your answer would then look like this:

1. A B C D E
   || || || || ||

If you marked B on your answer sheet, it would not necessarily mean that you are extremely strong or that you are not attractive. It would mean that ON THE WHOLE, You are strong describes you better than You are attractive.

Be sure that you select one statement from every pair. You are not permitted to omit any pair of statements. Mark your answers on your answer sheet starting with number 1 and continuing through number 66. You should finish the test in approximately 15 minutes.

1. A) You are too friendly for your own good.
   B) Your opinions are often incorrect.

2. A) Taking advantage of a person sexually makes you feel bad.
   B) You have no scruples in sex.

3. A) You are anxious.
   B) You are conceited.

4. A) To you life is a jungle.
   B) To you life is a bowl of cherries.

5. A) You day-dream politically.
   B) You don't formulate opinions about issues over which you have no control.

6. A) In political activities you confine your efforts to group action.
   B) In political activities you frequently indulge in individual endeavor.

7. A) You like a tightly organized group.
   B) You like a loosely organized group.

8. A) You haven't make any mistakes in your life.
   B) You can't get the mistakes you have made out of your mind.

9. A) There are some people you could never feel for.
   B) Sometimes you feel a real compassion for everyone.

10. A) You like instructions to be specific.
    B) You like instructions to be general.

11. A) You are sexually appealing.
    B) You are faithful.

12. A) You are responsible for most of your troubles.
    B) You sometimes get confused without any reason.

13. A) You frequently laugh at yourself.
    B) You don't like your favorite habits ridiculed.

14. A) You frequently get away with murder.
    B) People often blame you for things you didn't do.

15. A) You are not attracted to prudish people.
    B) You are not attracted to unkempt people.

16. A) You want badly to "belong."
    B) You don't care whether you "belong" or not.

17. A) You like a clean, neat house.
    B) You like good food.

18. A) You can never forget that love is more than just sex.
    B) You can take pleasure in sex as sex.

19. A) You are always on the lookout for new ways of attacking a problem.
    B) In general, you find the tried-and-true methods work best.

20. A) You are rebellious.
    B) You like discipline.

21. A) You don't like to gamble on getting a good break.
    B) You usually figure on getting a good break.

22. A) You get more credit than you deserve.
    B) You get less credit than you deserve.

23. A) You get into scraps you didn't start.
    B) When you get into trouble it is almost always your fault.

24. A) Most everybody lets you know directly what they think of you.
    B) Some people are secretly trying to get the better of you.

25. A) You positively like to be different from your immediate associates.
    B) Being different from your immediate associates make you uncomfortable.

26. A) People are either your friends or your enemies.
    B) People are rarely either real friends or real enemies.

27. A) Your hardest battles are with other people rather than with yourself.
    B) You are cocky.

28. A) You could like anyone if you tried.
    B) There are some people you know you could never like.

29. A) You are forgetful.
    B) You have a meticulous memory.

30. A) There are some people you would like to tell off.
    B) You are occasionally taken in.

31. A) People criticize you unjustly.
    B) People give you more breaks than you deserve.

32. A) You are charming.
    B) You are firm and resolute.

33. A) Disappointments affect you so little that you seldom think about them twice.
    B) Your daydreams are often about things that can never come true.

34. A) You would like to counsel a friend on his personal problems.
    B) You would like to give first aid to a friend.

35. A) You collect things.
    B) You lose things.

36. A) You like haphazard living.
    B) You like routine.

37. A) Stuffed-shirts amuse you.
    B) Stuffed-shirts get under your skin.

38. A) You keep calm in an emergency.
    B) You can obey orders.

39. A) You are difficult to please.
    B) You like to do favors.

40. A) You are aware of dripping water in the kitchen.
    B) You are not observant.

41. A) You don't mind a coward.
    B) You can't stand a coward.

42. A) You just can't stay mad even when you think you should.
    B) There are some people you would like to take apart.

43. A) You admire spontaneity in people.
    B) You admire efficiency in people.

44. A) You don't particularly like to march.
    B) You like to march with a group you feel proud to belong to.

45. A) You need someone in whom you can confide completely.
    B) You are selfish.

46. A) You play fair.
    B) You are an individualist.

47. A) There are some magazines to which you particularly turn for the substantiation of your political ideas.
    B) Your political ideas tend to be peculiar to yourself.

48. A) You can't help feeling antagonistic to people who hold important opinions radically different from yours.
    B) You like a lot of people who disagree with you violently on important issues.

49. A) Your interest in general principles occasionally gets you up in the clouds.
    B) You are a stickler for precision.

50. A) You have felt so sorry for someone you have cried.
    B) You have gotten so mad you cried.

51. A) Yours is a quick and ready sympathy.
    B) You are stern.

52. A) You are independent.
    B) You are loyal.

53. A) You are talkative.
    B) Often you're sure you've forgotten something important.

54. A) You would be happier if you felt more secure.
    B) You would be happier if you were less gullible.

55. A) You never change your basic beliefs.
    B) All your beliefs are open to debate.

56. A) You follow your conscience.
    B) You have ethical standards which you follow.

57. A) You are very proud of your membership in some groups.
    B) You don't go for groups.

58. A) You are indifferent to most people.
    B) You like or you dislike people.

59. A) You don't worry about physical disorders.
    B) Sometimes you figure you're a sure thing for ulcers.

60. A) You are dogmatic.
    B) You are sloppy.

61. A) There are some people you admire so much you would not question their opinion.
    B) You don't admire anybody very much.

62. A) Concerning your past actions you figure, "If I did it, it can't be too bad."
    B) If you had your life to live over, there would be a lot of things you'd do differently.

63. A) You admire careful, rigorous thinking.
    B) You admire brilliant, penetrating thinking.

64. A) The details of life are important to you.
    B) You are often thoughtless.

65. A) You are well coordinated.
    B) You seek new opinions.

66. A) You are self-confident.
    B) You are a good Joe.

TABLE 11

Test Scores for Control Group by Z-Scale Categories - MEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomy	1	26	164	164	79	54	51
	2	26	177	176	75	51	49
	3	20	144	139	67	59	46
	4	15	150	181	54	35	52
	5	22	164	173	59	35	50
	6	22	150	177	76	55	46
	7	26	146	156	57	38	54
	8	20	140	156	95	50	49
Average	1	32	158	160	69	50	52
	2	32	159	137	66	49	53
	3	34	156	151	64	42	50
	4	34	157	177	58	47	45
	5	30	150	151	67	43	50
	6	34	166	158	58	45	41
	7	33	156	151	63	35	53
	8	34	151	150	72	70	47
Heteronomy	1	37	165	185	65	56	49
	2	38	162	181	92	85	46
	3	39	153	174	86	55	41
	4	42	154	143	56	45	47
	5	38	153	149	59	37	50
	6	38	153	148	82	67	47
	7	37	180	180	48	32	37
	8	44	154	167	74	56	53

TABLE 12

Test Scores for Minimal Group by Z-Scale Categories - MEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale T_1	Siebrecht Attitude Scale T_2	Driving Simulator Test T_1	Driving Simulator Test T_2	Nat'l Test in Driving Educ.
Autonomy	1	23	182	185	47	40	47
	2	18	146	134	78	44	56
	3	27	168	176	65	37	53
	4	22	166	167	45	28	55
	5	18	142	154	61	45	52
	6	17	155	142	60	48	52
	7	26	137	143	60	34	54
	8	23	155	166	77	51	49
Average	1	36	168	178	57	42	53
	2	33	158	150	64	40	48
	3	36	168	171	56	39	41
	4	32	142	140	50	30	55
	5	29	156	138	69	67	53
	6	28	153	158	58	62	48
	7	32	174	182	67	42	55
	8	35	172	165	88	68	51
Heteronomy	1	41	162	153	49	36	53
	2	39	158	155	63	53	53
	3	40	146	167	58	33	47
	4	39	163	166	47	35	52
	5	39	168	157	67	50	47
	6	38	184	185	62	43	49
	7	45	176	180	65	41	40
	8	45	162	167	58	45	50

TABLE 13

Test Scores for Moderate Group by Z-Scale Categories - MEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomy	1	22	157	152	68	46	49
	2	24	156	171	88	85	55
	3	25	136	149	76	51	38
	4	23	161	158	102	73	46
	5	16	133	147	61	42	53
	6	21	133	135	68	48	47
	7	21	165	170	75	53	50
	8	26	180	146	75	57	52
Average	1	35	146	147	96	64	52
	2	28	179	172	71	40	46
	3	36	154	165	70	47	46
	4	31	141	137	74	51	52
	5	30	168	170	65	33	53
	6	31	174	168	70	43	57
	7	33	156	153	76	48	52
	8	30	160	150	72	50	53
Heteronomy	1	37	165	162	73	61	51
	2	38	168	160	47	40	50
	3	38	149	159	71	45	?
	4	48	170	169	55	42	51
	5	45	147	170	68	45	57
	6	38	157	152	62	55	52
	7	46	174	187	64	43	54
	8	40	163	168	52	27	49

TABLE 14

Test Scores for Strong Group by Z-Scale Categories - MEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomy	1	25	168	164	43	28	55
	2	25	150	152	55	47	48
	3	22	161	161	56	41	55
	4	22	173	179	56	45	54
	5	25	161	150	61	41	55
	6	19	157	179	44	41	49
	7	25	157	171	70	48	52
	8	28	154	157	47	36	45
Average	1	31	145	135	51	41	55
	2	29	152	172	73	42	50
	3	30	172	175	57	46	46
	4	32	177	177	88	69	52
	5	36	144	146	76	47	50
	6	31	151	152	64	43	48
	7	32	151	159	104	80	49
	8	36	155	164	64	43	55
Heteronomy	1	38	154	161	61	45	49
	2	39	155	158	64	51	46
	3	40	146	145	76	62	51
	4	41	144	150	38	30	49
	5	41	159	164	58	41	51
	6	42	182	151	62	44	49
	7	39	154	162	65	73	49
	8	37	177	150	59	46	48

TABLE 15

Test Scores for Control Group by Z-Scale Categories - WOMEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomy	1	23	145	161	73	57	52
	2	19	159	183	57	41	44
	3	26	177	185	65	48	48
	4	28	165	154	87	71	50
	5	21	179	162	60	35	46
	6	24	156	167	71	56	47
	7	26	158	149	73	52	46
Average	1	32	145	144	61	42	52
	2	30	165	181	70	59	47
	3	31	158	164	42	47	43
	4	30	139	133	72	50	50
	5	34	150	158	54	33	41
	6	33	184	178	80	49	53
	7	33	172	170	98	62	47
Heteronomy	1	39	147	140	41	37	45
	2	38	181	186	58	33	55
	3	38	159	154	61	51	49
	4	44	155	148	65	48	41
	5	43	157	161	74	38	52
	6	42	161	160	54	42	48
	7	39	158	153	75	63	44

TABLE 16

Test Scores for Minimal Group by Z-Scale Categories - WOMEN

Z-Scale Caregory	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomous	1	23	161	162	82	66	52
	2	21	159	153	86	62	53
	3	25	173	173	63	44	45
	4	28	183	187	54	37	41
	5	14	160	160	74	72	47
	6	21	152	164	72	39	51
	7	26	144	155	57	42	47
Average	1	37	166	165	59	42	48
	2	29	173	169	70	89	47
	3	33	163	176	71	52	47
	4	34	171	176	62	45	53
	5	36	152	171	68	49	50
	6	32	152	143	66	47	45
	7	31	182	180	76	57	49
Heteronomy	1	47	181	185	81	57	45
	2	39	178	176	81	56	48
	3	41	175	169	49	43	44
	4	40	134	138	70	45	43
	5	42	166	180	62	44	51
	6	38	173	144	61	44	53
	7	42	153	154	79	55	47

TABLE 17

Test Scores for Moderate Group by Z-Scale Categories - WOMEN

Autonomous	1	23	172	169	70	53	41
	2	26	139	154	89	59	44
	3	24	159	176	59	67	46
	4	26	158	160	69	47	48
	5	16	167	178	51	38	53
	6	19	155	153	61	55	50
	7	25	142	148	64	48	49
Average	1	31	161	165	66	56	45
	2	33	179	184	70	45	48
	3	35	153	144	65	47	51
	4	37	172	158	55	35	46
	5	35	141	163	92	69	46
	6	35	166	172	87	72	45
	7	34	153	158	77	60	39
Heteronomous	1	42	162	168	78	49	44
	2	40	149	153	94	66	40
	3	40	173	177	71	48	44
	4	41	146	150	79	57	41
	5	37	157	168	62	48	45
	6	40	181	181	72	37	46
	7	39	154	157	66	47	49

TABLE 18

Test Scores for Strong Group by Z-Scale Categories - WOMEN

Z-Scale Category	Subject	Z-Scale	Siebrecht Attitude Scale		Driving Simulator Test		Nat'l Test in Driving Educ.
			T_1	T_2	T_1	T_2	
Autonomous	1	28	173	187	75	59	43
	2	21	161	147	55	40	49
	3	21	152	146	56	38	52
	4	27	166	172	63	44	52
	5	20	166	177	61	49	47
	6	23	154	178	77	61	50
	7	26	149	155	78	69	42
Average	1	35	155	154	83	44	41
	2	36	161	162	51	34	46
	3	37	169	163	80	54	46
	4	32	189	184	79	57	53
	5	31	168	184	56	39	50
	6	33	168	153	53	39	54
	7	35	149	166	99	70	39
Heteronomous	1	38	136	157	48	28	48
	2	43	177	187	52	51	38
	3	39	168	177	59	46	48
	4	44	162	177	48	34	50
	5	39	156	164	68	56	49
	6	39	170	166	85	63	45
	7	41	184	192	73	59	45

TABLE 19

Base Skin Conductance Measures by Treatment Levels - MEN

Subjects	Fear-Arousal Levels							
	Control		Minimal		Moderate		Strong	
	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
1	77	67	59	63	14	14	71	77
2	22	17	13	14	11	13	14	43
3	50	37	31	37	14	21	63	83
4	45	16	43	42	10	14	29	45
5	20	15	34	28	56	50	43	59
6	20	17	91	83	21	22	10	14
7	43	31	11	11	29	32	59	91
8	48	37	42	36	67	77	53	63
9	56	59	37	36	48	45	36	63
10	50	36	53	40	33	48	71	77
11	31	38	38	50	91	125	14	25
12	16	10	56	48	14	19	10	29
13	45	40	29	27	13	14	29	45
14	27	48	15	13	45	53	10	14

TABLE 20

Base Skin Conductance Measures by Treatment Levels - WOMEN

Subjects	Fear-Arousal Levels							
	Control		Minimal		Moderate		Strong	
	T_1	T_2	T_1	T_2	T_1	T_2	T_1	T_2
1	13	11	12	12	14	19	56	59
2	77	77	20	19	10	11	14	20
3	53	59	11	14	10	11	67	91
4	83	56	71	71	59	63	50	53
5	33	30	13	10	18	22	91	77
6	45	28	63	45	19	21	83	91
7	11	10	29	20	26	31	17	36
8	10	10	77	83	77	91	59	67
9	14	11	91	91	45	53	83	91
10	38	57	67	71	53	59	24	53
11	53	43	77	91	77	91	67	83
12	26	33	43	53	50	59	18	38
13	33	33	30	26	83	91	59	67
14	16	11	13	14	14	14	14	50

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BIOGRAPHICAL SKETCH

Henry M. Moore, Jr. was born October 3, 1920, at Thomasville, Georgia. In June, 1937, he was graduated from Thomasville High School. He received a Bachelor of Arts degree from Emory University in October, 1943. From 1943 until 1946 he was in the Army of the United States during which time he was stationed in Manila, P. I., as an instructor in the Philippine Institute for the Armed Forces. Following his discharge from the Army he engaged in the ice, coal, and cold storage business and was a wholesale produce merchant. In 1951 he entered Florida State University, where he received a Bachelor of Science degree in February, and a Master of Arts degree in August, 1952. During the academic year 1952-1953 he was employed as a teacher in the high school at Boston, Georgia. Following this he returned to Florida State University where he was employed as manager of one of the food service units, and was a part-time student until June, 1954. During the next year he was employed as manager of the Bainbridge, Georgia, Air Base Officers' Club. From 1956 until 1960 he was employed as a counselor by the Division of Vocational Rehabilitation and worked in the W. T. Edwards Tuberculosis Hospital, and the Florida State Hospital in Chattahoochee. In February, 1960 he entered the Graduate School of the University of Florida in the Department of Psychology. He worked as a graduate assistant in that department in the fall semester of 1960; and was employed as a full-time instructor in the Rehabilitation Counseling Curriculum

BIOGRAPHICAL SKETCH - continued

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This dissertation was prepared under the direction of the chairman of the condidate's supervisory committee and has been approved by all members of that committee. It was submitted to the Dean of the College of Arts and Sciences and to the Graduate Council, and was approved as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 14, 1965

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